

# **Appendix A**

**Sierra STEM Online Teacher Advisory Discussion Board**  
**Summary of Findings**  
**May, 2011**  
*Group Works Project #11-623*

**Background**

The goal of the Sierra STEM (*Science, Technology, Engineering, and Math*) Community Collaborative Grant is to “build the capacity of middle and high schools in Placer and Nevada counties to prepare students for entry into high-wage, high-demand occupations in the engineering & design and manufacturing & product development sectors.”

**Research Objectives**

- Obtain feedback on Sierra STEM Collaborative Grant from participating teachers.
- Evaluate strategies employed to-date.
- Solicit suggestions to improve the program’s effectiveness in the future.
- Inform resource and budget priorities for next year’s grant.

**Research Methodology**

- Online discussion board, initially open for three days, extended to six days.
- Moderated by Ellen Schaefer, independent researcher with Group Works.
- Eleven CTE teachers participated anonymously.
- Seven high schools from five school districts were represented.

**Detailed Findings: Table of Contents**

|   | <u>Page</u> |
|---|-------------|
| Overall Evaluation of Grant.....                                | 2           |
| Greatest Obstacles to Sierra STEM Goals .....                   | 3           |
| Grant Funding Priorities Suggested by Teachers .....            | 4           |
| Key Themes and Recommendations.....                             | 4           |
| Professional Development and Stipend-Supported Activities ..... | 6           |
| Equipment .....   | 9           |
| System Support .....  | 10          |
| Career Cruising Software .....                                  | 11          |
| Career Exploration.....   | 11          |
| Communication - Meetings.....                                   | 12          |
| Communications - Website.....                                   | 13          |
| Communication - Other .....                                     | 14          |
| Marketing Materials .....                                       | 15          |

## Overall Evaluation of Grant

Teacher feedback indicates that the grant is making strong progress towards its goal. The vast majority of teachers said the grant has been “very effective” (eight out of nine answering) and one said it has been “somewhat effective.”

*“Fantastic program, have never seen anything similar in education or industry.”*

*“Organized, focused, and funded. This has been the difference in moving our CTE program forward at Colfax High School.”*

*“When we did a survey of the outgoing seniors that had been in CTE classes, I was very surprised to see how many of them were going into either mechatronics or welding or automotive at Sierra College. We also had quite a few who were going to 4-year schools to study engineering.”*

*“Somewhat effective: we are all fighting against a bigger driving force, meaning the need for public education to teach to the test, which in my opinion diverts attention from the long term perspective of exposing students to rich and rewarding experiences like those developed by the Sierra STEM activities.”*

*“The equipment purchased will continue to be around and used. The connections we made are still there. I think the legacy of this project will last long after the funding has dried up.”*

The program has had a positive impact in multiple ways, including the following:

- Increased teacher collaboration, both within school sites and between schools and districts
- Strengthened current curriculum and enabled new CTE classes
- Supported core curriculum by integrating math into CTE courses
- Engaged students with hands-on learning experiences
- Provided equipment that allows students to use current industry tools
- Inspired teachers to keep current and share their enthusiasm for the field
- Exposed students to STEM education/career paths

***“The most positive impact of the Sierra STEM grant so far has been ...***

*“... the lives it has changed. Very hard to measure inspiration, but many of the projects have inspired students to pursue careers they have never thought about prior to Sierra STEM.”*

*“... giving schools newer technology that they (students) will see in industry and at post-secondary schools.”*

*“...the full engagement of my students in the projects and hands-on learning experiences.”*

*“...being able to learn from each other. Collaborating was one of the most valuable parts of the grant for me.”*

*“... a consistent math thread has been built in across the CTE curriculum and will impact all students at Colfax High School.”*

**Greatest Obstacles to Sierra STEM Goals**

- Emphasis on A-G, core competency classes and teaching to standardized tests leaves limited time and resources for electives.
- Shrinking school budgets make it difficult to keep up with changing technology and offer meaningful project-based classes.
- Stigma of CTE classes continues to exist in our culture.

*“There is still a perception among most non-CTE teachers, counselors and administrators that our classes are ‘not real classes.’ UC requirements, standardized testing all reinforce this.”*

*“US society does not embrace math and science as in other countries. Programs like Sierra STEM are the only way to change these attitudes; our only hope for a high US standard of living is to train our students in these skills.”*

- A few expressed concern for sustainability of the program after grant funds are depleted.

## Sierra STEM Grant Funding Priorities Suggested by Teachers

- The top priorities for Sierra STEM funding suggested by multiple teachers include:
  - Collaboration time (5 teachers)
  - Technology improvements, equipment, and materials (5)
  - Professional development and teacher training (4)
  - Curriculum development with Sierra College and industry (2)
  - Keeping programs and industry linked through community partnerships (2)
- Also mentioned were:
  - Active engagement of site decision makers (1)
  - Strengthening ties with post-secondary faculty (1)
  - Strengthening institutional capacity (1)
  - Finding ways to get a larger body of students in CTE (1)
  - Keep CTE programs running (1)

## Key Themes and Recommendations for Future Sierra STEM Efforts

- Provide collaboration time for teachers at their sites and with teachers at other schools to support a regional CTE professional learning community.
  - Find ways to facilitate monthly or quarterly face-to-face interaction with teachers from different sites.
  - Provide a list of schools, scheduled release days, breaks to help them schedule informal collaboration time.
  - Make it a condition of equipment grants that teachers host a meeting at their site for other teachers to see their site and share project ideas and instructional strategies.
- Offer sub-grants to purchase equipment that will inspire the development and delivery of dynamic, relevant curriculum and enhance the long-term impact of the grant, but with strings attached ...
  - Equipment must be related to projects that meet SS goals.
  - Projects enabled by equipment must contain a math competency component.
  - Curriculum enabled by equipment must include exposure to STEM-related careers.
  - Teacher must host a teacher open house meeting 1/year to demonstrate equipment and class project.
- Fund professional development and training. Encourage teachers to share learning with other teachers in CTE professional learning community.
- Link CTE classes to CORE curriculum.
  - Demonstrate CTE contribution to CORE competencies.
  - Assist with getting CTE classes approved as meeting UC/A-G requirements.
- Maximize industry partnership opportunities.

- Tap regional industry partners for funding and training.
  - Develop list of potential classroom speakers.
  - Find industry sources for scrap steel for welding classes.
- Continue fostering links between school levels, especially high school to Sierra College.
    - Invite each CTE teacher to be a member of one of the college advisory boards.
    - Offer high school student tours at Sierra College each semester.
    - Reach down to the feeder middle schools to let them see what is offered at the next levels.
  - Educate administrators and counselors about STEM careers and classes.
    - Keep them informed of success stories and educated about opportunities in the field. Get them to observe or participate in a class project.
    - Educate schools on how to use Career Cruising software and ensure its use by all students.
  - Promote outreach to parents: assist with recruiting, educating and organizing parents who work in STEM-related careers/industries and local industry leaders to promote STEM education in the schools.
    - Continue PR to keep success stories in the news for parents to read.
    - Develop and promote use of video at parent nights where elective choices are made.
    - Continue developing marketing materials to reduce the stigma of CTE and encouraging parents and students to consider STEM classes/careers.
    - Host a Parent Information Night at Sierra College.
  - Consider offering fee-based CTE classes outside of regular school hours.
    - After school classes.
    - Summer Institute at Sierra College.
      - MTTA/CDTC does one at Cal Poly SLO in July
    - Special classes for girls.
  - Continue using e-mail to send teachers key information via newsletter and links to information, including links to information on the Sierra STEM website.
  - Continue looking for public relations opportunities to get Sierra STEM success stories in the news. Good publicity has the potential to build awareness and credibility with multiple audiences: parents, administrators, industry partners, potential students and teachers.
    - Consider starting up a blog with project ideas and success stories.

## Professional Development and Stipend-Supported Activities

- All 11 teachers had participated in some form of professional development and many had participated in more than one activity.

|                                    |   |
|------------------------------------|---|
| Mastercam Training                 | 7 |
| Catapult Training                  | 7 |
| Fraction Contraption Training      | 5 |
| Externship Experience              | 5 |
| Worked with Sierra College Faculty | 5 |
| Attended Conference                | 5 |
| Other                              | 6 |

- Ten of the 11 teachers had received a stipend for grant-related activities. Specific activities mentioned including the following:
  - Collaborated with other teachers to develop and expand curriculum
    - Advanced Mechatronics class
    - Multi-discipline course for Freshman to feed into CTE courses
    - Developed long term department plan
  - Created a teacher course, developed trainings to share curriculum
  - Developed website to advertise/explain mechatronics
  - Attended Maker's Fair, got new ideas for projects
  - Went to CNC Software to learn how to run Mastercam
  - Painted and moved 3 classes
  - Set up a Metals/Physics lab
  - Meeting businesses to assess needed skills and student employment opportunities
  - Externship
  - Wrote an application for UC credit for the mechatronics class
- Ten of the eleven described activities that involved collaboration with other teachers. Some collaborated with their entire department and some with one or two other teachers. Many felt this was one of the most valuable aspects of the Sierra STEM grant.

*"I collaborated with our metals/welding teacher. My expertise is in electronics/programming. We were able to learn a lot from each other. Collaborating was one of the most valuable parts of the grant for me. I would like to be able to collaborate with other teachers."*

*"Our entire department (four teachers) worked hand-in-hand on this project and continue today with a focused department wide plan. This collaboration was born with this STEM project."*

- Benefits of the Sierra STEM professional development opportunities included:
  - Exposure to new teaching methods and inspiration to strengthen existing methods (step-by-step instructions)

- Able to expose students to more new curriculum, processes, equipment, and techniques (Catapult equipment, CNC, Dual-shield welding, Mastercam, Laser Engraving components)
- Networking: opportunity to meet, work with and learn from other educators in same field and make connections for future assistance
- Gain confidence in teaching (Master Cam)
- Provides projects to interest and engage students and improve retention (Catapult remembered in detail 3 years later, excited about clock project, Mastercam, Laser Engraving)
- Introduction to new programs and expanded use of existing ones (Autocad, Inventor, ALGOR, GD&T)
- Improve instruction for advanced students
- Encourages integration of multiple disciplines in one curriculum (metal work in to Mechatronics)
- Simple and effective way to teach fractions
- Keeps teachers current and adds industry relevance (Robotics)
- Increases enthusiasm for teaching
- New curriculum development (Design Tech)
- Encourages students to pursue STEM education after high school (SC Mechatronics, UC in engineering)
- Students develop leadership skills working on projects. (Lunabotics)
- Students exposed to Mechatronics fundamentals in high school are able to absorb more advanced concepts at Sierra.

*“Each experience/activity I have participated in has either strengthened what I currently teach or assisted me in adding new material to my curriculum and provided me support for directions I feel are good for my students.”*

*“Really keeps my teaching current and keeps me enthused to share current techniques and ideas.”*

*“I have a student that took my class, enjoyed it and is now attending Sierra College’s Mechatronics programs. He loves his studies at Sierra College and credits my class with opening his eye to this field.”*

- Benefits of Sierra College faculty connections
  - Shop upgrade recommendations
  - Guest lectures
  - Meet/recruit students
- Suggested ways to share knowledge from professional development
  - Collaboration time at the school site
  - Organizations like CITEA, CDTC, and CTEONLINE
- What teachers like/want more of
  - Time to get together with teachers from other sites, districts



- Seeing each others' shops, getting ideas to improve, retool
- Sharing, comparing projects

*"I most enjoy sharing best practices with other teachers in my teaching subject areas. It takes years to develop projects that are both popular with students, successful and teach the skills and concepts that we want. Ideas and samples can be brought together, or experienced at each site ... which is also valuable to see how the facility works."*

## **Industry Connections Mentioned**

- Companies
  - Auburn Bike Works
  - Barnum Mechanical
  - Boutry's Engine Shop
  - California National Guard
  - Cox and Son
  - Electronic Carbide, Inc.
  - J&W Auto
  - Mariah Power
  - Ormat Nevada Inc.
  - Pasco Scientific
  - RCD Engineering
  - Schatz Energy Research Center
  - Stilleto Hammers
  - WyoTech
- Externships
  - Mechatronics employer
- Mentors
- Titles
  - Master Machinist
  - CNC Programmer
  - Draftsman
  - Designer
- Sierra College Connections
  - Mechatronics Advisory Board
  - Student tours of Sierra College labs

## Equipment

- Nearly all of the teachers (ten out of eleven) had purchased equipment with STEM grant funds. Equipment purchased included:
  - 4<sup>th</sup> Axis
  - Books
  - CNC Mills
  - CNC Plasma Cutters
  - CNC Router
  - Computers
  - Exhaust system
  - Flip cameras
  - Haas LT-1
  - Haas TM-3
  - LCD displays
  - Mastercam Software
  - Microcontrollers
  - PlasmaCams
  - Plotter
  - Robotic arm parts
  - Small tape measures
  - Solidworks Software
  - Techno CNC router/mill
  - ULS 50 Watt Laser
  - Ultra sonic range finders
  - Uprint rapid prototyper
  - Vises
- The equipment had a significant impact on the curriculum offered at the schools, teacher enthusiasm and student engagement.
  - More hands-on opportunities for students
    - “Actually making stuff.”
  - Enabled more current real-world applications of drafting, engineering, science, and math.
  - New classes and curriculum
    - Advanced Mechatronics
    - Prototyping section

*“Advanced Mechatronics was a new class. Without the help from the grant, we could simply not have offered the class.”*

*“I now can show students how parts are made in the real world today, not from the 1970’s.”*

*“It allowed us to open up possibilities that all students could perform high level prototyping and it also makes our end products better quality. We added a whole prototyping section to our curriculum.”*

*“Students are very excited. This is most often a new experience for them. One of the first times they get to use “adult” equipment. It also validates the classes, as they get a unique “real life” experience. They think that it is ‘cool.’”*

*“Students learn firsthand the power and benefits of CNC equipment. They can produce things that would be nearly impossible to make in any other way. They get to see the applications of Math and Science to modern equipment.”*

## System Support

- Most said their system was supportive, but a few claimed that support is only superficial and many feel that there is work to be done to educate administrators and counselors and other teachers in the system about the value of the STEM programs and goals.

|                     |   |
|---------------------|---|
| Very supportive     | 7 |
| Somewhat supportive | 0 |
| Mixed               | 1 |
| Not supportive      | 1 |

*“Very: They like the support and visibility that Sierra STEM brings to the district.”*

*“Mixed: On the surface they are very supportive. However with the budget cuts, they are not willing/able to run the classes with workable numbers. (24 workable vs.37 average required)”*

*“Not supportive: We have decision makers at both my site and district level who say they support STEM & CTE, but when questioned about relevant topics they are truly uninformed or truly not supportive.”*

## Suggested Ways for Sierra STEM to Facilitate Greater System Support

- Educate counselors/administrators about value of CTE and applied skills.
  - Have counselors come in and make some projects
  - More outreach to site administrators to highlight teacher collaboration which fits with their PLC goals
  - Invite administrators and counselors to meetings
  - Teach them that CTE is not a “dumping ground.”
  - Educate that all students need hands-on, applied learning
- Link importance of CTE to CORE Curriculum and needed skills
  - Show improvements in Math test scores.
  - Show how it connects to STAR testing.
  - Create lesson plans around math department curriculum.
  - More A-G fulfillment
  - Educate math teachers how to tap into real world applications of math concepts
- Promote the link to jobs
  - Develop and share more data about where the jobs are in the future

## Career Cruising Software

- The Career Cruising Software is not being well used in the schools.
  - Only three teachers have used it in their classes.
  - Only four teachers are aware of it being used in the school by counselors or in the career center and they represent only three of the seven schools represented.
  - Four teachers are not sure if it's being used at their school and two knew that it wasn't being used.

|                            |   |
|----------------------------|---|
| I have used it in class    | 3 |
| The counselors use it      | 2 |
| Available in career center | 4 |
| Not sure if it's used      | 4 |
| Not used in our school     | 2 |
| Other                      | 2 |

## Career Exploration

- Teacher suggestions for ways Sierra STEM can encourage students to pursue STEM education and careers include:
  - Classes that are relevant and use real industry equipment (e.g. plasma cutter)
  - Project-oriented curriculum where students have a sense of accomplishment from getting projects to work.
  - In-class presentations, more guest speakers from industry (e.g. Tesla Motors, EDEO, Google)
  - Equipment improvements, update shops
  - Time to work with Math and Physics departments to develop strategies to support core classes.
- Teacher suggestions for ways to increase interest among more young women in STEM careers include:
  - Exposure in mandatory classes
  - Need to have multiple girls in a class
  - Get UC credit
  - Get special certification on diploma for those who complete a CTE sequence of classes
  - Survey parents to assess perceptions of CTE course catalog descriptions
  - Provide a friendly, non-threatening environment
  - Offer girls-only classes
  - More exposure and education of counselors about STEM careers to break down myths
  - Start girls with smaller, less noisy tools
  - Allow projects to be student-driven

## Communication – Meetings

- The majority of teachers found both school project planning meetings and advisory meetings beneficial. They enjoy and appreciate the time to collaborate. They identified the key outcomes as improved teaching methods and curriculum that is more relevant and engaging for students.

|  | Very Beneficial | Somewhat Beneficial | Not Beneficial | Did Not Attend |
|--|-----------------|---------------------|----------------|----------------|
| School Project Planning Meetings         | 8               | 3                   |                |                |
| Advisory Meetings at the Ridge in Auburn | 6               | 2                   |                | 3              |

*“Enjoyed the collaboration time with colleagues.”*

*“These are very good. Mainly because we got to connect with our STEM partners from other schools ... I would love to see more meetings with the STEM teachers to find out what they do, what challenges they have, how they overcame them, what works for them ...”*

*“My favorite exchange of ideas and shared practices.”*

- They particularly enjoy seeing each other’s shops and learning from each other about how to implement projects and practical ideas for overcoming common challenges. Many suggested doing more frequent, informal meetings at each other’s school sites.

*“Love to see other schools and shops. Love learning new projects and skills other people are doing.”*

*“I also would love to see other schools/shops/programs ... do not see the need for a specific agenda ... when we go to one another’s shops, the conversation automatically starts ... What projects do you do? How did you do that?”*

*“Limited agenda, but let the teacher lead the discussion.”*

*“Share best practices and tour facility, 1 – 1.5 hours, after school.”*

- They also welcome the opportunity to see more professional sites either at Sierra College or in industry.

*“The meetings we put together at industry sites were priceless.”*

- Not surprisingly, teachers are not as enthusiastic about the more administrative parts of the meetings.

*“The only thing that I did not like was a lot of talk about when we were going to meet next time. At times it felt like we were meeting just to meet.”*

### **Communication – Website**

- Website usage is mixed. About half (six) of the teachers have been to the website, but five have never been there. Only four have gone there more than two times and they were from one of two schools: Colfax or Placer high schools.

| <b># of Visits to Sierra School Works Website</b> |   |
|---|---|
| 10 or more times                                  | 2 |
| 3-9 times   | 2 |
| 1-2 times   | 2 |
| Never   | 5 |

- Those who use the site go there to check in on other projects, look for curriculum ideas and see what’s happening.
- Very few had any suggestions about how to improve the site. One person suggested developing a blog.

## Communication – Other

- There was higher usage of both the newsletter and e-mails with links compared to the website, indicating that teachers need to be “pushed” to view content.

| Communication Materials Used           |   |
|--|---|
| Both e-mails with links and newsletter | 5 |
| Only e-mails with links to websites    | 3 |
| Only Sierra School Works newsletter    | 3 |
| Online teacher directory               | 0 |

*“The e-mail updates (for example about upcoming events) works best for me. This is a great way to get information out.”*

*“E-mail updates are great.”*

- Very few had any suggestions about communications. I think this is not their area of expertise or key interest. The only suggestion was to include administrators on the mailings.

*“I think the communication is good.”*

*“I think they are great, no additional required.”*

*“I think it would be good to include both site and D.O. administrators on the mailings. It’s important for them to have a good idea what’s going on.”*

## Marketing Materials

- Nine out of eleven of the teachers had used the customized marketing materials and all viewed them as beneficial, about half saying very beneficial and half saying somewhat beneficial.

| Evaluation of Marketing Materials |   |
|-----------------------------------|---|
| Very beneficial                   | 4 |
| Somewhat beneficial               | 5 |
| Not beneficial                    | 0 |
| Not used                          | 2 |

*“They helped explain and promote the class.”*

*“My admin and counselors loved the glossy flyers! My parents are happy to get something, even in B&W.”*

*“The marketing support was great, thank you!”*

- Suggested marketing improvements included the following:

*“We discussed putting together a video of students at work for use at “Elective Exploration: events, etc.”*

*“I think a 3-fold brochure would be great.”*

*“Option to update them more frequently would be helpful.”*

*“Small give-away items seem to generate the most interest with students.”*

*“Having Sierra and other industry vendors at our events is very helpful. This promotes programs as well as communicated to our community we are connected beyond the walls of the high school and that translates to opportunities for students.”*





## Engineering Support Technology at RHS

**Take this hands-on product development class**  
Do you want to develop the hands-on skills necessary to be a great engineer? Are you always taking things apart or putting them back together? Then RHS' Engineering Support Technologies is the program for YOU!

**Use your creativity to design, build and experiment**

- Turn your ideas into designs using Computer Aided Design (CAD), Parametric Modeling Techniques and Computer Aided Manufacturing (Mastercam)
- Make projects such as clocks, ping-pong paddles, jewelry boxes, CO2 cars, bridges, plaques, trophies and more
- Learn Computer Aided Manufacturing using laser engravers, CNC mills and Proto-types

**Prepare for your future**

- Study Engineering, Mechatronics, Energy Technology, Applied Art & Design, Construction Management, and Engineering Support Technology at Sierra College for certificate, degree or transfer
- UC Davis, Cal Poly and CSU Sacramento & Chico are looking for design and engineering students who have the hands-on skills taught in Engineering Support Technology

**Find a Highly Paid Career**

|                                 | Salary Range         |
|---------------------------------|----------------------|
| Design Engineer                 | \$53,500 - \$74,700  |
| Product Development Manager     | \$83,800 - \$146,900 |
| Package Design Manager          | \$78,000 - \$130,700 |
| CAD Drafter                     | \$34,000 - \$68,500  |
| Electric/Electronics Technician | \$33,000 - \$53,200  |
| Manufacturing Engineer          | \$51,800 - \$70,200  |
| Mechanical Engineer             | \$53,700 - \$74,300  |

**New RHS Program Sign up now!**

**For More Information:**  
Please contact Mr. Frank (room M4) or email: [dfrank@rocklin.k12.ca.us](mailto:dfrank@rocklin.k12.ca.us)

**SIERRA COLLEGE**  
This class is supported by the Sierra College STEM Collaborative and partially funded through a grant from the California Community Colleges Chancellor's Office to promote Science, Technology, Engineering and Math (STEM).  
[www.sierracollege.edu](http://www.sierracollege.edu)  
© 2010 Chancellor's Office, California Community Colleges.



## Engineering Support Technology at RHS

**Use your creativity to Develop Products**

**Sign Up for EST Today:**

- Make clocks, ping-pong paddles, jewelry boxes, CO2 cars, bridges and trophies
- Utilize cutting edge tools like 3D printers, Lasers, and a variety of CNC Machines
- Learn Computer Aided Design (CAD)

**Learn More:**  
Contact Mr. Frank (M4) or email: [dfrank@rocklin.k12.ca.us](mailto:dfrank@rocklin.k12.ca.us)

**SIERRA COLLEGE**  
This class is supported by the Sierra College STEM Collaborative and partially funded through a grant from the California Community Colleges Chancellor's Office to promote Science, Technology, Engineering and Math (STEM).  
[www.sierracollege.edu](http://www.sierracollege.edu)  
© 2010 Chancellor's Office, California Community Colleges.



## NEVADA UNION Miners

### IDEA - Innovative Design and Engineering Applications

**Use your creativity to experiment**  
In this hands-on class, work with teams to turn your ideas into products using real-world design software, applying engineering principles and working with tools used in industry. This product design class is taught by physics, computer drafting and Career Technical Education teachers.

**Design, engineer and produce**

- Develop your designs using Computer Aided Drafting (CAD) & make 3D prototypes
- Innovate, test and produce electric cars, wind mills and projectile launching devices
- Production lab includes a foundry, sheet metal tools and machine shop equipment

**Prepare for your future**

- Study Engineering, Mechatronics, Energy Technology and Engineering Support Technology at Sierra College for certificate, degree or transfer
- UC Davis, Cal Poly, and CSU Sacramento & Chico are looking for design and engineering students who have the hands-on skills taught in this IDEA class.

**Find a Highly Paid Career**

|                                 | Salary Range         |
|---------------------------------|----------------------|
| CAD Drafter                     | \$34,000 - \$68,500  |
| Design Engineer                 | \$53,500 - \$74,700  |
| Electric/Electronics Technician | \$33,000 - \$53,200  |
| Manufacturing Engineer          | \$51,800 - \$70,200  |
| Mechanical Engineer             | \$53,700 - \$74,300  |
| Package Design Manager          | \$78,000 - \$130,700 |
| Product Development Manager     | \$83,800 - \$146,900 |

**New NUHS Class Sign up now!**

**Sign up for the I.D.E.A. lab now!**  
Math - Geometry and at least one of these courses - physics, wood shop or Computer Aided Design.

**For more information, contact:**  
Mr. Andersen (room 88), Mr. Ford (room C5) or Mr. McDaniel (room J204)  
Email: [mford@njhsd.com](mailto:mford@njhsd.com)  
Call: 530-273-4431 ext. 2221  
or go to [www.njhsd.com/webpages/MFord](http://www.njhsd.com/webpages/MFord)

**SIERRA COLLEGE**  
This class is supported by the Sierra College STEM Collaborative and partially funded through a grant from the California Community Colleges Chancellor's Office to promote Science, Technology, Engineering and Math (STEM).  
[www.sierracollege.edu](http://www.sierracollege.edu)  
© 2010 Chancellor's Office, California Community Colleges.



## OAKMONT MINERS

### Design Tech At Oakmont High School

**Take this hands-on product development class**  
Create your own designs and use real world tools to make unique projects. This year-long International Baccalaureate (IB) elective class is open to all students who are juniors or seniors. Consider this class if you're a self-starter, actively participate in class, like to research new ideas and want to experience product development.

**Use your creativity to design, build and experiment**

- Turn your ideas into designs using Computer Aided Design (CAD) & 3D Solid Modeling software
- Make projects such as candy bars, cutting boards, clocks, picture frames and more
- Learn Computer Aided Manufacturing using laser engravers, CNC mills and Proto-types

**Prepare for your future**

- Study Engineering, Mechatronics, Energy Technology and Engineering Support Technology at Sierra College for certificate, degree or transfer
- UC Davis, Cal Poly, and CSU Sacramento & Chico are looking for design and engineering students who have the hands-on skills taught in Design Tech

**Find a Highly Paid Career**

|                                 | Salary Range         |
|---------------------------------|----------------------|
| Design Engineer                 | \$53,500 - \$74,700  |
| Product Development Manager     | \$83,800 - \$146,900 |
| Package Design Manager          | \$78,000 - \$130,700 |
| CAD Drafter                     | \$34,000 - \$68,500  |
| Electric/Electronics Technician | \$33,000 - \$53,200  |
| Manufacturing Engineer          | \$51,800 - \$70,200  |
| Mechanical Engineer             | \$53,700 - \$74,300  |

**New OHS Class Sign up now!**

**Sign up for Design Tech**  
For more information, please contact Mrs. Mahoney (room P-15), or Mr. Dicus (room IA2), email: [sdicus@njhsd.us](mailto:sdicus@njhsd.us) or go to [hobis.njhsd.us](http://hobis.njhsd.us).

**SIERRA COLLEGE**  
This class is supported by the Sierra College STEM Collaborative and partially funded through a grant from the California Community Colleges Chancellor's Office to promote Science, Technology, Engineering and Math (STEM).  
[www.sierracollege.edu](http://www.sierracollege.edu)  
© 2010 Chancellor's Office, California Community Colleges.

Students get taste of engineering in tech class - Colfax Record - Windows Internet Explorer

http://colfaxrecord.com/detail/196957.html?content\_source=&category\_id=1&search\_filter=&user\_id=&event\_mode=&event\_ts\_from=&event\_ts\_to=&list\_t...

File Edit View Favorites Tools Help

MARKETPLACE HOMES JOBS COUPONS CARS CLASSIFIEDS

Cloudy, 39° Complete Forecast

Colfax California

Subscriber Services

Search

Stories Events Photos All

Advanced Search

News Sports Opinion Living Obituaries Pics & Vids Calendar Contact us

Local Election Staff Blogs Education Business Politics Motoring Crime Logs Tahoe Traffic Cameras

1/5/12 | comments | 223 views

SHARE

Welcome! Log In Sign Up Learn More

Change Location: Colfax

## Students get taste of engineering in tech class

Course is mandatory for Colfax High freshmen

Kim Palaferri, Colfax Record Correspondent



Colfax High School's science and math departments are on the cutting edge with a class that gives freshmen a taste of what it's like to be an engineer.

Last year's Design Tech and Integrated Computers courses have been combined and recreated into one class, Tech Essentials for College and Career. The revamped class is based on the foundation of math, science, engineering and design that could lead students into a competitive career path.

With the help and guidance of Sierra College staff, Colfax High teachers Christian Kinsey and Wade Wolff recreated the Tech Essentials class, which incorporates Fraction Contraption, created by Jonathon Schwartz. Fraction Contraption seeks to spark students' interest in math with games and by making connections with math use.

Students had to fabricate a battery-operated car built on a chassis with a motherboard while using tools and programs on the Internet to design and draft the body. The course finale was a class-wide racing competition on Dec. 20. They also created a video and web portfolio about what they learned and their experiences that was presented to teachers, classmates, family and staff, with a few selected videos presented during the Tech Essential Showcase.

The 18-week long course presented many challenges for the 68 students in the class. One student found that time management was key in finishing the project.

"I had a lot of fun doing the soldering and making my car, but toward the end, there was still a lot of work to be done," said Olivia Freer.

Freer's classmate Rilev Stokes had much of the same opinion

Kim Palaferri/Colfax Record

Colfax High School science teacher Christian Kinsey and student Liesha Douglass trouble shoot her car to fix problems before the start of the race in the school's gymnasium.



To see more click here

### 2011 Chevrolet Camaro LS

Features: V6 3.6 Liter, Manual 6-Spd, Silver, 6,051 miles

\$36,988

MORE INFO

Available Exclusively From Performance Chevrolet

myColfax

Post your stories, blogs, photos, videos and events

Share

Pix Blogs Vids Stories Users

"Emma" (Romantic Comedy)

"The Interviews" (A Comedy)

Internet

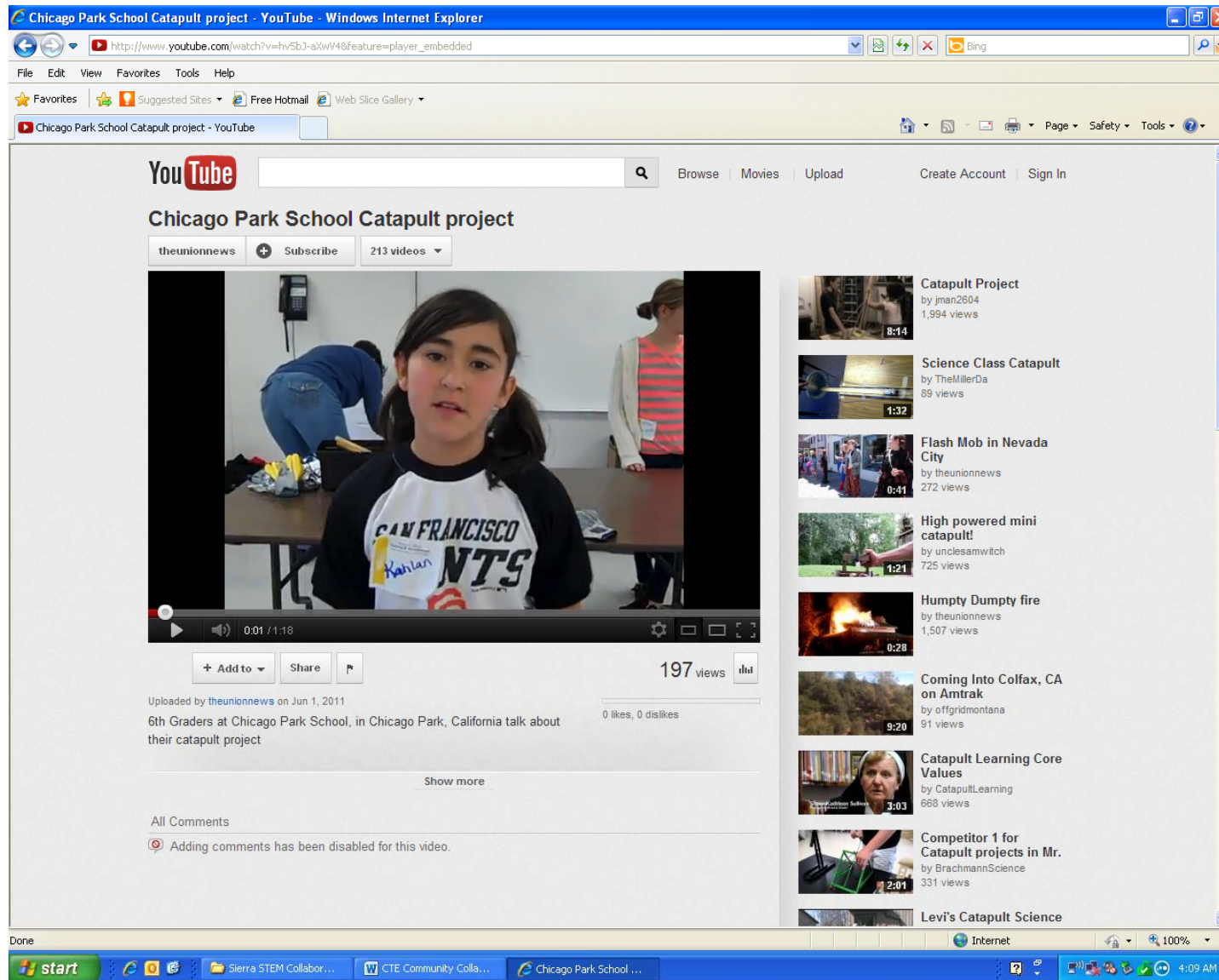
100%

4:00 AM

## Students Get Taste of Engineering in Tech Class

Colfax Record, January 15, 2011

[http://colfaxrecord.com/detail/196957.html?content\\_source=&category\\_id=1&search\\_filter=&user\\_id=&event\\_mode=&event\\_ts\\_from=&event\\_ts\\_to=&list\\_type=&order\\_by=&order\\_sort=&content\\_class=1&sub\\_type=&town\\_id=](http://colfaxrecord.com/detail/196957.html?content_source=&category_id=1&search_filter=&user_id=&event_mode=&event_ts_from=&event_ts_to=&list_type=&order_by=&order_sort=&content_class=1&sub_type=&town_id=)



**6th Graders at Chicago Park School, in Chicago Park, California talk about their catapult project, June 3, 2011**

[http://www.youtube.com/watch?v=hv5bJ-aXwV4&feature=player\\_embedded](http://www.youtube.com/watch?v=hv5bJ-aXwV4&feature=player_embedded)

Chicago Park gets new charter school (video) | TheUnion.com - Windows Internet Explorer

http://www.theunion.com/article/20110603/BREAKINGNEWS/110609888&parentprofile=search

File Edit View Favorites Tools Help

Chicago Park gets new charter school (video) | TheUn...

Tuesday, March 20th 46° F | 7-day forecast Contribute | Advertise | Place a Classified Ad | Archives | ePaper | RSS Feeds | Contact Us | Feedback Subscription

**TheUnion.com**  
Serving Western Nevada County, California

Home News Sports Entertainment Opinion Community Outdoors Photos + Videos Visitors' Guide Deals Jobs Homes Autos Classifieds

Search  
Go

Guest Login

Subscribe to access all articles.  
Learn more about our Subscription Plans.

advertisement | your ad here

**Water Damage Company**  
24 Hour Property Damage Restoration Service. Don't Fret. Just Call Us!  
[www.waterfirmold.us](http://www.waterfirmold.us)

**Pell Grants For Mothers**  
Free Your Life, Moms May Qualify For Grants To Start School Online!  
[PellGrants.ClassesAndCareers.com](http://PellGrants.ClassesAndCareers.com)

**Free Obituaries Search**  
1) Type In Someone's Name 2) Find Their Obituary Instantly!  
[Obituaries.Archives.com](http://Obituaries.Archives.com)

**Nevada City Foreclosures**  
Free list of foreclosures, fixer uppers and estate sales save 1000's  
[goldcountryhomeinfo.com](http://goldcountryhomeinfo.com)

AdChoices

**STAY** Deals in your inbox  
Enter Your Email Here GO

**Event Calendar** Submit an Event

UPCOMING EVENTS SEARCH

3/20/2012 wendy spratt, art showing

Chicago Park gets new charter school (video)

Send us your news  
Friday, June 3, 2011

By **Trina Kleist**  
Staff Writer

Email Print

Recommend



**Hands-on program**  
Chicago Park School sixth-grader Kahlan McDaniel watches the drill press create a groove in the axle shaft she'll use on her catapult. It's the kind of hands-on program typical of charter schools that will be used in both the charter and traditional programs at Chicago Park School.  
*Photo for The Union by John Hart*

A hands-on approach to learning and a core of mathematics, science and technology will form the basis of a charter program that will open in the fall at Chicago Park School.

Chicago Park board members approved the charter school in May, and they are awaiting state confirmation, said Dan Zeisler, superintendent of the one-school district and principal at the K-8 public school off Highway 174, about 12 miles southeast of Grass Valley.

He is excited about the academic aspects of the new public charter program and the approach it already is infusing into the conventional program.

He's also frankly pragmatic about the financial angle.

Interdistrict transfers — the practice of allowing a student in one district to leave for another district — are being slowly shut down as districts battle budget cuts due to declining enrollment. No one wants to lose their students and the money that comes with them.

Grass Valley School District will phase out the practice starting with new students next year. Other districts also are starting to clamp down, Zeisler said.

## Chicago Park Gets New Charter School, June 3, 2011

<http://www.theunion.com/article/20110603/BREAKINGNEWS/110609888&parentprofile=search>

Auburn's Placer is High-tech - Auburn Journal - Windows Internet Explorer

http://auburnjournal.com/detail/171385.html?content\_source=&category\_id=&search\_filter=Auburn%E2%80%99s+Placer+is+High-tech+&user\_id=&event...

File Edit View Favorites Tools Help

MARKETPLACE HOMES JOBS COUPONS CARS CLASSIFIEDS

**Auburn** California

Subscriber Services

Auburn Journal e-EDITION READ DEMO

Search: [ ] GO

Stories Events Photos All

Advanced Search

Brenda Wibbenhorst  
All About Bookkeeping  
16069 Mackinaw Way  
Grass Valley  
530-277-2143

Cloudy, 43° Complete Forecast

News Sports Opinion Living Obituaries Pics & Vids Calendar Contact us

Local Election National State Staff Blogs Education Business Politics Motoring Crime Logs Tahoe Traffic Cameras

2/13/11 | 0 comments | 2269 views

SHARE

Welcome! Log In Sign Up Learn More

Change Location: Auburn

**Auburn's Placer is High-tech**

Teacher says iPad program good way to learn, save paper

By Bridget Jones, Journal Staff Writer



Ben Furtado/Auburn Journal

Placer High School junior Sam Wolken initiates the power source to his solar tracker while in his Advanced Mechanics class Friday afternoon. The Mechanics program at Placer High is four years old and is just one example of thriving technology at the school.

Technology is booming at Placer High School in the form of Twitter, Google Apps, robotics and more.

Teachers and students throughout the Placer Union High School District are using Google Applications.

Students are assigned e-mail accounts with their schools and can then use their accounts to interact with several Google Applications, said Dan Wilson, technology coordinator at Placer High.

"With their account they can upload documents, they can create Web pages, they can create forms," Wilson said. "They can make customizable forms, which my journalism class has done to collect data or conduct polls. What is nice is they can convert different types of files so they can be viewed on different computers."

Wilson said the school hopes to take its use of the applications, known in the district as PUHSD Apps for Students, to the next level.

"Ultimately the plan for next year is for students to start creating a digital portfolio using Google Docs, so students can take all their assignments, all their projects from all four years and keep that with them. They can hopefully use (that) for a future résumé to shoot to future employers, but that's still in the early stages for us."

Wilson said students in his production classes are also learning Adobe Master Collection Creative Suite 5, which allows them to use Photoshop, InDesign and Flash software. Wilson's journalism class uses WordPress to publish its online edition of the Hillmen Messenger newspaper.

Several teachers on campus also use Twitter to communicate

**CAC**  
Courthouse Athletic Club

**f** FREE Registration and one FREE month

11558 F Ave Club, Auburn 530.885.1964

Like 258 people like this. Be the first of your friends.

**myAuburn**

Post your stories, blogs, photos, videos and events

Share

Pix Blogs Vids Stories Users

**The Blame Game - ...**  
When it comes to high gas prices, most Americans reflexively blame the president, ...

**Get Your Plate in ...**  
The University of California Cooperative Extension's Let's Eat Healthy! Program ...

**Uniform Code of ...**

start

Sierra STEM Collabor... W CTE Community Colla... Auburn's Placer is Hig...

Internet 100% 4:22 AM

### Auburn's Placer is High-Tech, February 13, 2011

[http://auburnjournal.com/detail/171385.html?content\\_source=&category\\_id=&search\\_filter=Auburn%E2%80%99s+Placer+is+High-tech+&user\\_id=&event\\_mode=&event\\_ts\\_from=&event\\_ts\\_to=&list\\_type=&order\\_by=&order\\_sort=&content\\_class=1&sub\\_type=&town\\_id=](http://auburnjournal.com/detail/171385.html?content_source=&category_id=&search_filter=Auburn%E2%80%99s+Placer+is+High-tech+&user_id=&event_mode=&event_ts_from=&event_ts_to=&list_type=&order_by=&order_sort=&content_class=1&sub_type=&town_id=)

Colfax High teacher adds up benefits of hands-on math Colfax High teacher adds up benefits of h - Windows Internet Explorer

http://colfaxrecord.com/detail/159849.html?content\_source=&category\_id=&search\_filter=fraction+contraption&user\_id=&event\_mode=&event\_ts\_from=&event\_ts\_to=&list\_type=&order\_by=&order\_sort=&content\_class=1&sub\_type=&town\_id=

File Edit View Favorites Tools Help

Colfax High teacher adds up benefits of hands-on ma...

MARKETPLACE HOMES JOBS COUPONS CARS CLASSIFIEDS

Cloudy, 39° Complete Forecast

Colfax California

Search

Stories Events Photos All

Advanced Search

News Sports Opinion Living Obituaries Pics & Vids Calendar Contact us

Local Election Staff Blogs Education Business Politics Motoring Crime Logs Tahoe Traffic Cameras

9/23/10 | 0 comments | 1524 views

SHARE

Welcome! Log In Sign Up Learn More

Change Location: Colfax

## Colfax High teacher adds up benefits of hands-on math

In an era when advanced mathematics students are not fluent in fractions or calculating percentages, and employers report that new hires lack measurement skills, Colfax High School instructor Jonathan Schwartz sought a way to engage students of all ages in fun, hands-on math practice.

On Sept. 20, Schwartz introduced Placer Union High School District teachers to "Fraction Contraption" curriculum, share hands-on learning teaching techniques and lead teachers in constructing their own game board in the wood shop.

Schwartz developed the "Fraction Contraption" game and teacher training for the Sierra College Science, Technology, Engineering and Math (STEM) Community Collaborative (sierraschoolworks.com).

The STEM Collaborative works with schools to integrate academic and Career Technical Education to prepare students for STEM education and careers.

The training was supported by district leadership, according to Gregg Ramseth, director of Technology and Assessment for the high school district.

"Jono's workshop will model project-based lesson design and also provide an engaging game to build mathematics competency in both Math and Career Technical Education classes," said Ramseth.

Once the training is piloted, the Sierra STEM Academy will offer "Fraction Contraption" to other school districts in Placer and Nevada counties.

"Fraction Contraption" can be used in elementary, middle and high schools, explained Jonathan Schwartz.

"It meets California Education Standards including Grade 2 to 8: Number Sense, Statistics, Data Analysis, and Probability and Mathematical Reasoning as well as Algebra 1 & 2, Geometry,



Colfax Record file photo

Colfax High School math instructor Jonathan Schwartz shows Cody Alonzo and Luke Ramseth how to use their math skills in the woodshop.



myColfax

Post your stories, blogs, photos, videos and events

Share

Pix Blogs Vids Stories Users

Toby O'Geen, soil ... Do you know the difference between dirt and soil? Dirt is what you get inside your ...

Nature Docent ... No experience needed! We train you - it's easy! Do you love learning ...

Nature Docent ... No experience needed! We train

start

Sierra STEM Collabor... CTE Community Colla... Colfax High teacher a...

Internet

100%

4:25 AM

### Colfax High teacher adds up benefits of hands-on math, September 23, 2010

[http://colfaxrecord.com/detail/159849.html?content\\_source=&category\\_id=&search\\_filter=fraction+contraption&user\\_id=&event\\_mode=&event\\_ts\\_from=&event\\_ts\\_to=&list\\_type=&order\\_by=&order\\_sort=&content\\_class=1&sub\\_type=&town\\_id=](http://colfaxrecord.com/detail/159849.html?content_source=&category_id=&search_filter=fraction+contraption&user_id=&event_mode=&event_ts_from=&event_ts_to=&list_type=&order_by=&order_sort=&content_class=1&sub_type=&town_id=)

## Placer Union Teachers Add Up Benefits of Hands-on Math

### Sierra College Science Technology Engineering and Math (STEM) Academy offers training

ROCKLIN: In an era when advanced mathematics students are not fluent in fractions or calculating percentages, and employers report that new hires lack measurement skills, Colfax High School Math, Design Tech and 49er ROP Design and Construction instructor and successful inventor, Jonathan Schwartz sought a way to engage students of all ages in fun, hands-on math practice. On Monday, September 20 from 2 to 5 PM at Colfax High School Schwartz will introduce Placer Union High School District (PUHSD) teachers to “Fraction Contraption” curriculum, share hands-on learning teaching techniques and lead teachers in constructing their own game board in the wood shop.

Schwartz developed the “Fraction Contraption” game and teacher training for the Sierra College Science, Technology, Engineering and Math (STEM) Community Collaborative ([www.sierraschoolworks.com](http://www.sierraschoolworks.com)). The STEM Collaborative works with schools to integrate academic and Career Technical Education to prepare students for STEM education and careers.

The “Sierra STEM Academy” training is enthusiastically supported by district leadership according to Gregg Ramseth, Director of Technology and Assessment, PUHSD. “Jono’s workshop will model project-based lesson design and also provide an engaging game to build mathematics competency in both Math and Career Technical Education classes,” said Ramseth. Once the training is piloted, the Sierra STEM Academy will offer “Fraction Contraption” to other school districts in Placer and Nevada counties.

“Fraction Contraption” can be used in elementary, middle and high schools explained Jonathan Schwartz. “It meets California Education Standards including Grade 2 to 8: Number Sense, Statistics, Data Analysis, and Probability and Mathematical Reasoning as well as Algebra 1 & 2, Geometry, Mathematical Analysis, and Probability and Statistics,” said Schwartz. “The game is intended to be used for a few minutes daily so students practice enough to gain confidence.”

Understanding fractions is critical for advanced education as well as many careers explained Schwartz. “On a SAT math exam 52% of the problems require the use of fractions, proportions and decimals,” said Schwartz. “Similarly, 46% of questions on the Cal State Entrance Exam and 30% of the problems on the private pilot’s license are based on fractions, proportions and decimals. The military, police academies and culinary schools all require math entrance exams. People who work in wood and metal fabrication and the automotive industry use fractions daily.”

The “Fraction Contraption” consists of a wooden base and sliding tiles as well as two dice marked with numbers or fractions. Students roll the dice and move tiles based on their roll. In addition to adding and converting fractions, students get a lesson in probability as part of the instruction to increase their chances of pushing all the tiles into place before throwing a losing roll. It can be played with whole numbers or fractions. Students can compete against themselves or others. The fractions –  $1/8$ ,  $1/4$ ,  $3/8$ ,  $1/2$  and so forth up to one were selected to help with ruler use. Schwartz is also working on decimal and percentage versions of the game.

To expose students to skills applicable to the modern production workplace, some schools can opt to have students use a technical drawing to produce parts on a laser cutter and computer-controlled or manual router, and participate in sawing, drilling, sanding and assembling the game, explained Carol Pepper-Kittredge, CACT Director, Sierra College. “The physical act of constructing the game is expected to entice students to want to use it,” said Pepper-Kittredge. “Plus, it introduces design, measuring and production skills used in STEM careers. Schools can also opt for students to assemble the parts of the game.”

Sierra College recently won a grant from the National Science Foundation (NSF) to test the effectiveness of project based learning in increasing learning and retention of mathematics concepts as well as stimulating interest in technical education

and career paths. The NSF project will build on the work of the Sierra STEM Collaborative to promote integrated curriculum and technical career paths.

The STEM Collaborative brings Tech-Explorer catapult builds into schools, provides Career Cruising career exploration services and supports Career Technical Education at numerous high schools in Nevada and Placer counties as well offers professional development and teacher workshops through the Sierra STEM Academy. The STEM Collaborative has built a pipeline of students prepared to pursue Engineering, Mechatronics, Energy Technology, Fashion & Merchandising, Engineering Support Technology and Applied Art & Design at Sierra College. The STEM collaborative is funded by a grant from the California Community College Chancellor's Office to support the region's long-term economic viability through Career Technical Education.

For more information, go to [www.sierraschoolworks.com](http://www.sierraschoolworks.com) or contact Carol Pepper-Kittredge at [cpepper-kittredge@sierracollege.edu](mailto:cpepper-kittredge@sierracollege.edu) or (916) 660-7801.



## Catapult Launches Students' Interests in Product Development

ROCKLIN – Del Oro High School students in Loomis may never have considered how products such as phones, sun glasses and cars are designed, produced and sold. After building the Tech-Explorer catapults, developed by Sierra College through grant funding, freshman in the Tech Essentials class discovered new skills and explored careers in design and product development.

Daniel Gayaldo, Principal, Del Oro High School says that the school has benefited from the Sierra College STEM Collaborative ([www.sierraschoolworks.com](http://www.sierraschoolworks.com)). Through the partnership with Sierra College, teachers had professional development opportunities, consulted with college faculty and went on externships at manufacturers. In addition, the grant provided classroom equipment similar to what is used in industry and projects like the Tech-Explorer catapult. “The grant provided by Sierra College through the Sierra STEM Collaborative has opened up an exciting new world of hands-on experiences to our students,” said Gayaldo.

Freshmen are enthusiastic about the applied academics catapult project that included using mills, lathes and hydraulic presses according to Tom Stargaard who teaches Tech Essentials at Del Oro. “For students who have never made something from scratch or used industrial tools, it is a very empowering experience,” said Stargaard. “After completing the catapults, students’ evaluations were very positive.” Del Oro students reported:

*“I had fun getting to work hands-on with the tools and materials. I like the amount of trust we had to do it ourselves.”*

*“I liked learning how to use new tools and creating something that worked.”*

*“I enjoyed getting to build a project by myself.”*

*“My favorite part was finishing it and watching it in action.”*

Sierra College’s goal is to interest high school students in Science, Technology, Engineering and Math (STEM) education and careers explained Carol-Pepper-Kittredge, Sierra College CACT director, who administers the program. “The applied learning experience exposes students to product development careers,” said Pepper-Kittredge. “If students discover an interest in manufacturing, they may want to study Mechatronics, Engineering, Welding, Energy Technology and Drafting Engineering Support at Sierra College and learn more at <http://www.sierracollege.edu/programs/cte/programs.html>. Local employers are actively recruiting from these programs,” said Pepper-Kittredge.

Students apply math and measurement skills to produce metal parts of the catapult using hand and power tools. Then they assemble the catapults and compete against each other to see whose ball goes the greatest distance and is the most accurate. To learn more, go to [www.tech-explorer.com](http://www.tech-explorer.com).

The National Science Foundation and California Community College Chancellor’s Office awarded grants to Sierra College to create a pipeline of students from middle school to high school to college interested in and prepared to fill the need for skilled technical employees. For information, go to [www.sierraschoolworks.com](http://www.sierraschoolworks.com) or contact Carol Pepper-Kittredge, director, Center for Applied Competitive Technologies, Sierra College, at [cpepper-kittredge@sierracollege.edu](mailto:cpepper-kittredge@sierracollege.edu) or (916) 660-7517.

## **Placer Union High School District commends Sierra College STEM Collaborative Applied Academic Programs Prepare Students for Future**

ROCKLIN: Sierra College's Science, Technology, Engineering & Math (STEM) Collaborative ([www.sierraschoolworks.com](http://www.sierraschoolworks.com)) received recognition from the Placer Union High School District Board of Trustees at the board meeting on Tuesday, May 4 in Auburn, CA. Sandra Scott, director of grant development and career technical education (CTE) and Carol Pepper-Kittredge, director, Center for Applied Competitive Technologies (CACT) for Sierra College, were acknowledged for their many contributions to enhancing the Career Technical Education programs at Colfax and Placer high schools. They received beautiful wooden plaques customized by the teachers, unique wooden purses designed and created in the tech lab, and flowers.

The district expressed gratitude for: "their energy, contribution and commitment" and support of STEM "which has transformed teaching and learning, reinforced academics, integrated CTE disciplines, made learning relevant, engaged more students and united staff in the vision of preparing students for a challenging and dynamic 21<sup>st</sup> century workplace."

Gregg Ramseth, Director of Technology, Placer Union High School District, described the STEM impact as far reaching. "Great things are happening in our schools. Ask anyone who has strolled through Mechatronics, Design Tech, Ag Welding or Wood. Our students are the real beneficiaries as they are guided through these challenging learning environments with a fired up faculty," said Ramseth.

The objective of the Sierra STEM Collaborative is to help teachers attract students to technical careers by exposing them to real world design, product development and production tools and techniques. Through engaging projects, STEM instructors prepare students with relevant hands-on applied academic curriculum and encourage them further their education in engineering, mechatronics, energy technology and engineering support technology at Sierra College.

Sierra STEM Collaborative teachers integrate math and science into product development project curriculum grooming students to succeed in further education and careers. At Colfax High School, the STEM Collaborative teachers developed the new Design Tech ([www.colfaxdesign.com](http://www.colfaxdesign.com)) program with planning, professional development and other support from Sierra College. Design Tech students explore design principles while rotating through four sections of design and construction, metal, integrated computers and electronics to build components and assemble a model car.

Wade Wolff, Colfax instructor, said the Sierra STEM Collaborative was instrumental in developing the Design Tech program. "Sandra, Carol and the rest of the Sierra College team inspired us to consider new ways of teaching," said Wolff. Jonathan Schwartz, Colfax instructor says affiliation with the STEM Collaborative has been motivating. "These last couple years have been my most fun yet. I love teaching now even more than before," said Schwartz. "I thank Sierra College and STEM project for all that they have done to make that happen."

At Placer High School, Mechatronics ([www.placermechatronics.com](http://www.placermechatronics.com)) students learn a blend of mechanics, electronics, pneumatics and computer science as they build robots, cranes and solar trackers. The STEM collaborative supplied instructors with professional development opportunities and helped modernize the shop facilities according to Tom Stargaard, Mechatronics teacher. Placer students also learn to design parts using 3D computer software and fabricate them using laser cutters and production equipment. "Our partnership with the Sierra STEM collaborative has enabled us to offer our students a cutting edge advanced mechatronics program," said Stargaard. "These students will have a real advantage when they further their studies in this field."

The Sierra STEM Collaborative received a grant from the California Community College Chancellor's Office to support the region's long-term economic viability through career technical education (CTE). The project aligns education with business to develop relevant hands-on learning models, merge academics with technical education and fill the pipeline of future workers who are qualified for highly-paid, in-demand technical positions. For more information about the Sierra STEM Collaborative, go to [www.sierraschoolworks.com](http://www.sierraschoolworks.com) or contact Sandra Scott, Sierra College at (916) 781-6244.

## Sierra College Receives Awards at the Placer County Economic Development Summit

ROCKLIN: Sierra College received two awards during the nineteenth annual Placer County Economic Development Summit held last Wednesday, March 17th, 2010 at the Orchard Creek Ballroom at Sun City Lincoln Hills. About 215 people attended the summit which honors outstanding public-sector and private-sector contributions to the county's economic wellbeing.

Sierra College president, Dr. Leo E. Chavez, accepted an award on behalf of the College for its Solar Energy Technician Program which began offering classes during the fall of 2009. Steve Nichols, the economic development board chairman for Placer County, presented the award to Sierra for helping fill the need to have a skilled workforce in the rapidly growing photovoltaic energy field. "This course curriculum was developed in response to hundreds of projected new, well-paid local jobs for photovoltaic solar panel installers, inspectors, technicians and business-development specialists," Nichols said. "This course will enhance Placer County's long-term development and competitiveness by having a skilled workforce and local training opportunities in the renewable energy field." Sierra received grant funding through the California Community College Chancellor's Office for the program.

Sandra Scott, director of grant development and career technical education, received an award for her effectiveness serving as a liaison between the college and both the business community and local government agencies. and developing innovative new training and education programs to meet local employers demand for qualified staff. Councilman John Allard gave Scott her award, telling the audience "Sandra supports the college's effort to make education relevant for students, increasing the number of local residents who find meaningful employment and advising local economic developers on the value of Sierra College to our community," Sandra manages customized employee training that helps local businesses increase productivity and secured grant funding to support local employers training programs. Her accomplishments include:

- Impacting businesses' bottom line through lean manufacturing and process improvement training as well as technical skills such as IPC soldering and rapid prototyping.
- Securing the grant to develop the Mechatronics program at Sierra that has a track record of supplying highly qualified technicians to meet manufacturing and technology companies' needs. Plus, Mountain Mechatronics in conjunction with the California Ski Industry Association.
- Sierra STEM Collaborative working with Sierra College and feeder schools to attract students to technical careers. Programs established at High Schools: Lincoln, Placer, Colfax, Nevada Union, Oakmont, Truckee, North Tahoe.
- Serves on the Golden Sierra Workforce Investment Board.
- Serves as the education representative on the Placer County Economic Development Board.

For more information on these programs; visit [www.sierracollegectraining.com](http://www.sierracollegectraining.com); [www.sierraschoolworks.com](http://www.sierraschoolworks.com) , [www.sierraenergytech.com](http://www.sierraenergytech.com).

# Rocklin High Students Design Trophy for NASA Competition

## Sierra College Center for Applied Competitive Technologies Rapid Prototypes Award

ROCKLIN: Under the shadow of the Saturn 5 rocket at the NASA Space Center in Orlando Florida, Rocklin High School student Patrick Kelly watched as the trophy, he and three other students designed and Sierra College produced using a 3D printer, was presented May 28 at NASA's first annual Lunabotics Mining Competition

(<http://www.nasa.gov/offices/education/centers/kennedy/technology/lunabotics.html#Joe%20Kosmo%20Award%20for%20Excellence>).

The trophy, developed by high school students and made in Rocklin, CA using the Sierra College Center for Applied Competitive Technologies ([www.sierracollege.training.com](http://www.sierracollege.training.com)) rapid prototyping equipment, was presented to Montana State University's team. The two-day competition attracted 22 university teams that designed and built remote controlled or autonomous excavators (lunabots) to collect and deposit a minimum of 10 kg of simulated moon dirt within 15 minutes. The event was hosted by the NASA Exploration Systems Mission Directorate (ESMD) in collaboration with NASA Lunar Surface Systems to promote Science, Technology, Engineering and Math (STEM) as well as encourage innovation in lunar excavation.

Rocklin High School instructor Dan Frank teaches Engineering Support Technologies (EST) and made the initial connection with NASA. "The EST program of study at Rocklin High School engages students in the product development cycle," said Frank. "When I contacted NASA to explore opportunities, I discovered that they needed a Lunabotics trophy. Making the award offered a creative, real world product design challenge that would entice my students."

Patrick Kelly, John Gildea, Michael Porter and Bryce Adams designed a six wheel, 8x12x2 inch model of a lunabot. They developed the trophy concept from a picture on the competition announcement and began sketching ideas. They designed each component – wheels, hubs, bracing and frame – using Inventor software. Then they produced, tested and refined their model.

According to Frank, students learned the subtractive production process where material is milled and machined off solid material to make the parts as well as the additive process where material is added in to build up the parts through rapid prototyping. "Producing the trophy on Sierra College's three dimensional printer cut the development time in half and reduced the cost by more than 80% when compared to machining," said Frank. "The students also learned functional analysis and changed the design after they evaluated the model." Students can use these skills to study Engineering Support Technology, Engineering, Mechatronics and Energy Technology at Sierra College, and pursue Science, Technology, Engineering and Math careers.

Sierra College Center for Applied Competitive Technologies (CACT) provides technical expertise and rapid prototyping services to Northern California Manufacturers reducing the cost and time it takes to develop new products and get them to market. Sierra College CACT and Training & Development also offer on-site customized employee training. For more information, go to [www.sierracollege.training.com](http://www.sierracollege.training.com) or contact Carol Pepper-Kittredge at [cpepper-kittredge@sierracollege.edu](mailto:cpepper-kittredge@sierracollege.edu) or (916) 781-6288.

## **Instructors Learn MasterCam to Prepare Future Workforce**

### **Sierra College Science, Technology, Engineering and Math Collaborative offers training**

ROCKLIN – Retirements and fewer opportunities to take technical education classes due to funding cuts are creating a shortage of employees with skills to design, engineer and repair equipment. The Sierra Science, Technology, Engineering & Math (STEM) Community Collaborative ([www.sierraschoolworks.com](http://www.sierraschoolworks.com)) was formed in response to this need. The Collaborative brought together ten high school and Sierra College Career Technical Education instructors to learn MasterCam (a computer aided design and manufacturing software application) and Computer Numerical Control (CNC) machining skills at Rocklin High School on Monday, June 6, 2011.

Dan Frank, Engineering Support Technology instructor, Rocklin High School (<https://sites.google.com/a/rocklinusd.org/engineering/>) and Scott Seacrist, iDesign instructor, Lincoln High School, conducted the training at Rocklin High School's Engineering lab. Participants learned how to set up computer code in MasterCam, and then created dominoes and stacking blocks on CNC milling machines.

“Networking with other instructors, sharing project ideas and gaining an increased understanding of the software was valuable; it was a good combination of instruction and practice,” reported participants.

The California Community College Chancellor's Office awarded a SB70 grant to Sierra College to create a pipeline of students from middle school to high school to college interested in and prepared to fill the need for skilled technical employees. To learn the needed skills for local, in-demand, highly paid careers, students can pursue Engineering, Mechatronics, Welding, Energy Technology, and Design and Engineering Support at Sierra College ([www.sierracollege.edu](http://www.sierracollege.edu)).

For information about the Sierra STEM Collaborative, go to [www.sierraschoolworks.com](http://www.sierraschoolworks.com) or contact Carol Pepper-Kittredge, director, Center for Applied Competitive Technologies, Sierra College, at [cpepper-kittredge@sierracollege.edu](mailto:cpepper-kittredge@sierracollege.edu) or (916) 660-7801.