

## Dear i3 Learning by Making Project Partner:

We are thrilled to announce that the new *Learning by Making STEM* course has launched at the six partner i3 schools in Mendocino County this Fall. After a series of Saturday trainings during the 2014-15 school year, we met in June at Ukiah HS with twelve teachers for a four-day intensive institute. Here we tested lesson plans and fine-tuned four units of the course (turtle logo, understanding electronics, basic board programming, and measuring heat and light) and we previewed a biology unit, involving the MudWatt.

Based on focus group interviews and surveys, the WestEd interim report reveals: "Last summer, only 18% of teachers felt confident in conducting their own classroom experiments by using what they learned from the Summer Institute. This summer, 50% of the teachers reported that they felt confident in teaching their students by using what they learned from *Learning by Making* trainings." SSU also actively involved the teachers in developing the curriculum. Teachers were invited to review the units and were encouraged to try the units out and provide

suggestions. In response to teachers' needs, SSU has developed short tutorial videos for teachers to review during instructional preparation. Lastly, one of the teachers shared: "This professional development was the most effective training I've had since becoming a teacher."

It was critical to get classrooms equipped before students showed up for the Fall semester, so the SSU team undertook multiple trips to schools in August to deliver materials and hardware, and to install the servers that allow SSU to push updated lesson plans and software updates as needed. While scheduling pressures were intense, and technology glitches created challenges, we are pleased that the course is up and running at the start of the semester. Lots of lessons learned!

What's next? SSU developers are holding weekly teleconferences with teachers in order to troubleshoot concerns and to share class highlights. WestEd, the i3 external evaluation team, will conduct research visits at school sites starting in late Fall. The next teacher PD dates are Oct. 24 at Point Arena HS and Dec. 5 at Willits HS.

## What Are the Students Saying?

With the course underway, students are enthusiastic about exploring the new ways of thinking about science. Students enrolled in the Willits High School class taught by Susana Ramirez and Laura Herman had this to say:

What I have been learning in STEM is programming which is hard but fun at the same time. Not only have I been learning programming I've also been learning teamwork. ~ Alex

I chose to do STEM because technology is a big part of everyday society. In addition is I know how to manipulate and program a computer than I am already ahead of the game. ~ Nicole

STEM lets me show the creative part of me. ~ Karen

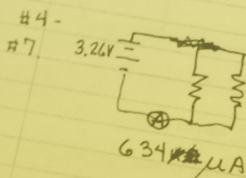
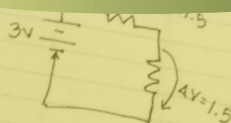
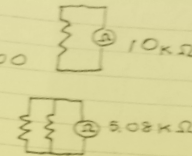
Even though this class may be frustrating I really enjoy it. It teaches not only me but others that you need to experiment. The point of this class is to try new things with little or no knowledge. ~ Ryan

I like knowing that a single command can create an amazing drawing. It makes you realize that nothing really is impossible. ~ Mikayla

So far this class is very cool. I like being able to command the turtle to do things. It helps make the time go by fast. STEM also puts credit towards the college plan. ~ Emily



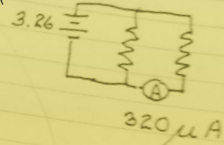
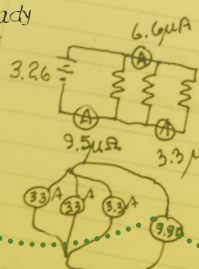
"The STEM program is in my opinion the best way to learn about working with partners and computer programming as if it were real life." ~ Jeremiah



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$$3.26 \text{ V} = 634 \times 10^{-6} \text{ A (R)}$$

$$R = 5 \text{ k}\Omega$$



$$E = IR$$

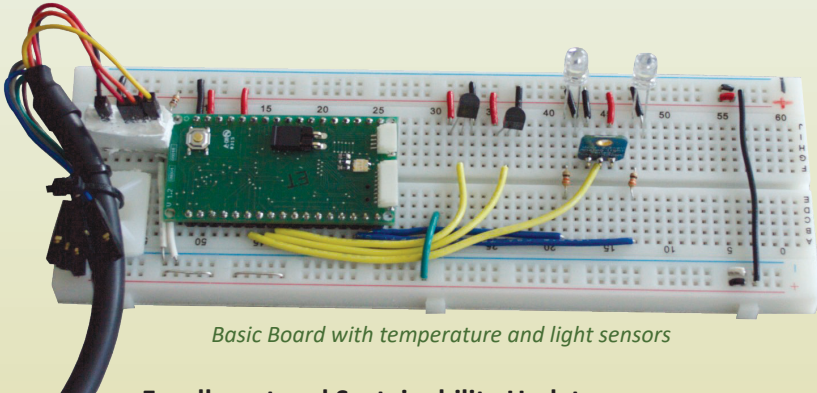
$$3.26 = 320 \text{ R}$$

$$R = 10 \text{ k}\Omega$$



## New Course Receives a “D”!

In May, the new i3 STEM course received approval by the University of California to be listed as a “D” subject college-prep course. It is recognized as an Integrated STEM Laboratory Science course. Now students can use Learning by Making to satisfy a year of required lab science for UC/CSU admission eligibility.



*Basic Board with temperature and light sensors*

### Enrollment and Sustainability Updates

Planned enrollment county-wide in the new course was 135 students. Just before the semester started, combined enrollment jumped to over 150. The increased demand is good – we want more students to experience (and test) the course, within budget and logistical constraints. To meet this increased demand and to provide more students a chance to conduct individual experiments, the project seeks



*Teachers calibrate their basic board temperature setups.*

additional funding from foundations and businesses who want to strengthen STEM education in our schools. Support has recently come from Keysight Technologies (soldering of 30 basic boards) and the Fluke Corporation (digital multimeters) for a total of \$4,000 in donations. Community investment in this project will help to sustain the efforts and impact of the *Learning by Making* project. Know of potential donors? Please contact Susan Wandling : [susan.wandling@sonoma.edu](mailto:susan.wandling@sonoma.edu)  
Ph: 707-664-3122



*Scenes from the Ukiah June 2015 trainings.*

### Acknowledgments

*The Learning by Making teachers –*

- Anderson Valley HS: Kim Jenderseck, Jim Snyder
- Fort Bragg HS: Kayla Davis, Megan Schmitt
- Point Arena HS: Kai Hamblin, Howard Cole
- Round Valley HS: Amanda Derby, Ann Marie Bauer
- Ukiah HS: Allison Baldwin, Patty Halpin, Edwin Kang
- Willits HS: Laura Herman, Susana Ramirez

*MCOE Staff –*

Theresa House, Emory Upchurch, Sky Shorba.

*Hardware/Software Developers (Donors) –*

J. Garrett Jernigan, Brian Silverman, Barry Silverman, Andru Luvisi, Douglas Clarke.

*Learning by Making: STEM Success for Mendocino County, an “Investing In Innovation” (i3) program, is funded by the U.S. Department of Education.*

To join our LbM group page, send email to [lynnc@universe.sonoma.edu](mailto:lynnc@universe.sonoma.edu).