F.E.M.M.E.S.
FEMALES EXCELLING MORE IN MATH ENGINEERING AND THE SCIENCES

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FEMMES NEWSLETTER

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A New Year of FEMMES

To our FEMMES parents, principals, teachers, volunteers, sponsors, and supporters,

It's that time of year again. The school year is back up and running for FEMMES participants and volunteers alike and we are excited for another year of achieving our mission (found in column on the right). We look forward to sharing our excitement for STEM to young girls and giving them confidence and mentors in these areas of study.

This year, we will continue to execute our mission through our fall and spring Saturday capstones, after school events at schools in the region, and various community events. Check out the content in the rest of the newsletter for follow-up on our events from the past few months and other stories. As usual, to stay up to date on FEMMES, check out our website (http://femmes.studentorgs.umich.edu/), Facebook (facebook.com/femmesatuofmichigan) page, and Twitter (@FEMMESatUM).

Inside This Issue

Our Mission

FEMMES (Females Excelling More in Math, Engineering, and Science) is dedicated to closing gender and racial divides in CS/STEM (Computer Science/Science Technology Engineering and Math) through hands-on activities led by female faculty, graduate students, and undergraduate students. Working specifically in diverse, under-served communities, FEMMES creates a collaborative environment that helps young girls build knowledge and self-confidence in CS/STEM and exposes them to great role models so that they may pursue their dreams without hesitation.

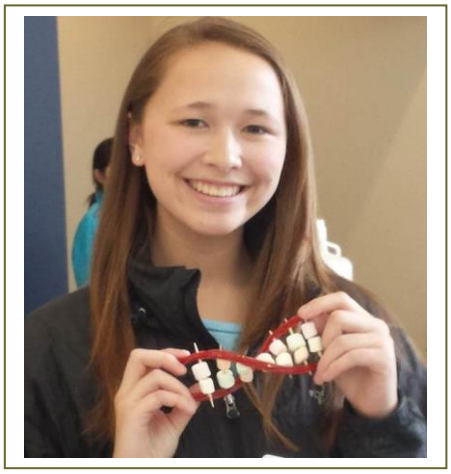
Spring Capstone Event and a FEMMES Milestone!

On Saturday, March 28th, FEMMES put on their capstone event, a bi-annual occasion. With over 150 girls in 3rd-8th grade on campus at the spring capstone, FEMMES has now officially reached over 1,000 girls through capstones alone! At the spring capstone we had a particularly special keynote speaker. Dr. Sophie Lavieri came from Simon Fraser University in Canada and is the founder and director of Science in Action. Science in Action has a similar mission to FEMMES and is a free science outreach program that has been around for 10 years and reached over 80,000 kids, many of which are from disadvantaged backgrounds. Sophie put on a fantastic keynote address filled with countless interactive chemistry demonstrations. She certainly has a knack for teaching and engaging kids, as evidenced by their enthusiasm during her talk and the frequent spontaneous hugs from the girls throughout the rest of the day when they spotted her between activities. There's even a photo of it included in the photo collage on page 6. Speaking of activities, there were 17 different activities total and a demonstration during the

Please see *Capstone* on page 4

One Day Closer Event

This past May, FEMMES participated in the "One Day Closer" event put on by the Michigan Translational Oncology Program (TOP). This event is designed to give the general public the chance to observe world-class scientists in action and hear about their research and discoveries through seminars, tours, and learning stations at the North Campus Research Complex. "The goal is to let people know about groundbreaking research at the University of Michigan" says TOP scientist Ashley Harris. FEMMES had a booth at the event where we had a hands-on demonstration called "Edible DNA". Enjoyed by kids and adults, participants got to learn about what DNA is made out of, what it does, and it's role in cancer. After making their own DNA out of various treats, the kids could eat their project at the end. The motto for the TOP One Day Closer event:



"While we know we cannot cure cancer in a day, each day of research moves us one day closer to a cure."

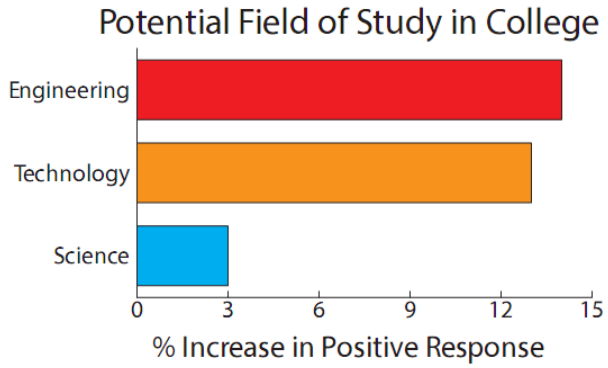
The FEMMES Effect

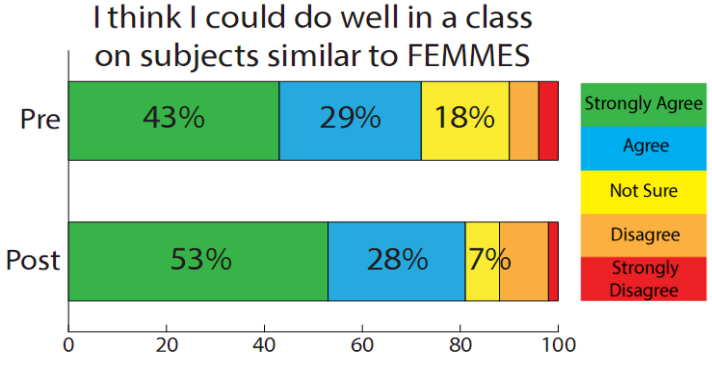
Now that we have reached over 1,000 girls in our capstone events alone as well as hundreds more in our after school events and community events, we think it is a great time to share some of our data on the impact of FEMMES.

FEMMES had their first capstone in the spring of 2012. Recently, we started collecting surveys to assess the girls' interests in STEM subjects and careers as well as their confidence in studying STEM fields before and after a FEMMES event. As you can see to the right, just one day at a FEMMES capstone has impressive positive effects on the girls' career interests and academic confidence. Additionally, some of the survey data is not quantitative including specific career interests and favorite parts of an event so it is difficult to summarize in a newsletter. Nevertheless, some of the best answers to the free response questions about what they think of when they think of STEM include:

- "I think of so much cool stuff, it almost makes my head hurt"
- "I think of computers and cars. I think of solving problems involving engineering and chemistry."
- "I think about advancing technology to help make people with illness or challenges in their life live more easily and about inventing and designing."

There are many other great responses, but this brief sampling highlights the impact of FEMMES on these girls!



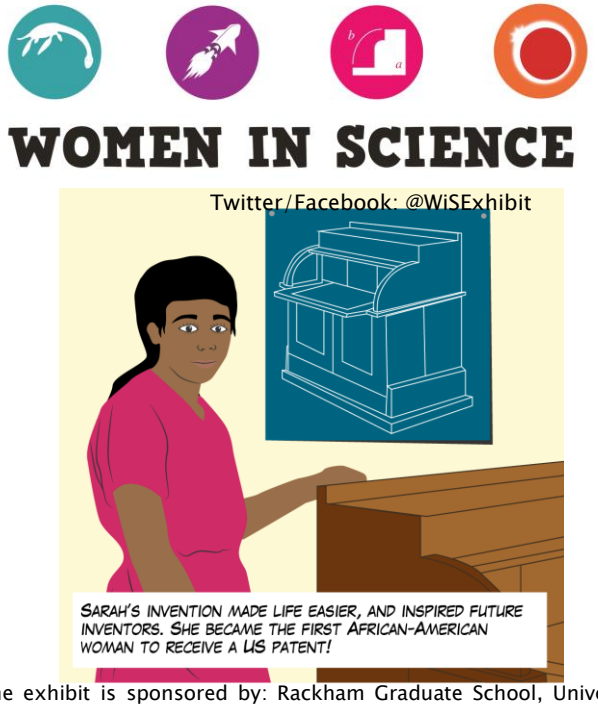


Famous FEMMES Exhibit:
Museum of Natural History

This issue, instead of featuring a single famous in STEM, we want to highlight the impressive exhibit designed by PhD student and former FEMMES board member Ann Marie Macara. Although always interested in STEM, Ann Marie was inspired to do the project because of her work with FEMMES and her desire to continue to inspire and promote women in STEM in another venue.

From the beginning, Ann Marie knew she wanted highlight some of the less well-known women in STEM in history. She knew that there were many unsung heroes, but still she was "sadly surprised to find out how little information there was about women in science, especially that there was almost no information about women of color in science throughout history". The four women on display representing each branch of STEM are Mary Anning, Annie Easley, Sarah Goode, and Wang Zhenyi. While it was a long process to develop the exhibit and a lot of work, Ann Marie remained determined to bring recognition to these historically under-appreciated brilliant women and redefine the perception of "scientist".

She took the project from idea to reality to create an inspiring, kid-friendly exhibit that you must check out. There, you can learn more about this awesome exhibit as well as see and learn from all the other great displays at the museum. The exhibit is on display at the University of Michigan Museum of Natural History through December 2015 (www.womeninscienceexhibit.com/index.html).



* The exhibit is sponsored by: Rackham Graduate School, University Life Sciences Institute, MAAS Professional Development Award, Program in Biomedical Sciences, Dept. of Cellular, Molecular & Developmental Biology, Women in Science and Engineering, FEMMES, and CEW Riecker Graduate Student Research Grant.

Take FEMMES Home: Bringing STEM to the living room

Continue hands-on STEM activities with your kids in your own home

Density Tower: Layers of Fun

Supplies:

-A small clear glass

-Honey, Corn Syrup, Maple Syrup, Milk, Dish Soap, Water, Vegetable Oil, Rubbing Alcohol

-Food Coloring for the water and rubbing alcohol

-A grape, a cork, a Lego piece, a nickel, popcorn kernel, a bolt, a plastic bead, other house hold items

**You don't need all the supplies listed, just syrup, water, and vegetable oil would provide a fun small density tower.

Getting Started:

1. Using the image on page 4 as your guide, add the most dense solution to the bottom of your glass first. (The liquids listed in the supplies are also in order from most to least dense).

Please see ***Density*** on page 4

Capstone from page 1

lunch provided on math and banking for a full day of STEM. The activities and their lead professor or organization included:

- Boats, Boats, Boats (Chem. Engin. Grad Society)
- DNA extraction: Fruits and Humans (Chem&Bio Interface Training Program)
- Emergency Dept. Simulation (Dr. Mariel Lavieri)
- Unlocking the Secrets of Light (Dr. Monica Valluri)
- Survival of the Fittest: The Online Game Challenge (Maris Polanco)
- Alive with Heat: Shrinking Polymers (Dr. Anne McNeil group)
- Molecule Mania (NSF Center for C-H Functionalization)
- Play with your Food: The Science of What We Eat (Biophysics Grad Student Council)
- Assistive Technology: Speak with Your Eyes and Type with Your Head (Dr. Jane Huggins)
- Energy Vampires (Dr. Carol Menassa)
- Bouncing Ball Polymers (Alpha Chi Sigma)
- Insect Insanity (Ann Marie Macara)
- Minecraft Programming (GameStart School)
- Animation & Game Design (GameStart School)
- Human Bone Puzzle (Dr. Karen Guerin)
- Light Chemistry (Emily Nelson)
- Robot Challenge (Society of Women Engineers)

Each group of girls rotated through four age-appropriate activities and provided the girls with an interactive experience in the same classrooms and labs that college STEM students learn in. We could not put on so many impressive activity rotations were it not for the many amazing faculty and their students who design and execute the activities. A big THANK YOU to all those who donated their time and expertise! As always, check out or facebook page as well as page 6 for photos from the event.

Density from page 3

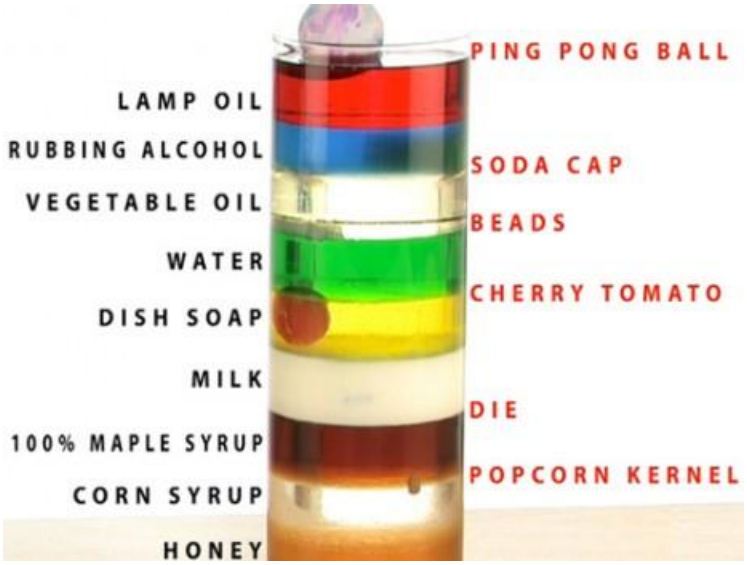
2. SLOWLY pour in the next most dense liquid in the glass and repeat until you are done with the liquids you have. The more you can limit the disruption/mixing of the different liquids, the better and faster they will form the layers. Don't forget to add food coloring to the water and other colorless solutions for a better looking density tower.

3. One by one, add the items from the list such as the grape or lego piece to your density tower and see which layers they suspend in.

If you poured carefully, do you see the separation of the different liquids?

Why do you think some of the objects float at different layers?

The concept known as density is responsible for this separation of the layers in the colorful tower you made. Density is a function of the mass (m) of a substance divided by the volume (v) and is represented by the equation density=m/v. Density tells us how much "stuff" (the mass) is packed in to a certain space (the volume). Unlike weight, which is changes depending on the strength of the force of gravity, mass does not change. For example, the mass of a single water molecule would not change mass in outer space compared to here on earth, but the weight would. Getting back to density, the water molecules in a swimming pool are packed closer together than the water molecules found in air, so the water vapor in the air is above the swimming pool. Another example comes from helium balloons. Helium molecules do not pack together as closely as the rest of the molecules in air and they have less mass, so that is why helium balloons seem to "float" in the air.



FEMMES Sponsors:

We could not do what we do without all of our financial sponsors! They help keep our events free and help us continue to grow in the number of events we run and the number of young girls we reach. If you are a sponsor of FEMMES as we do not have your logo, please email us and we will be sure to include that in future newsletters. If you would like to become a sponsor of FEMMES either as an individual or as an organization or company, please see how to donate on our website, http://femmes.studentorgs.umich.edu/. We owe it to all of you who help make FEMMES possible and want to make STEM education for women a priority.

Announcements

Outreach Events:

- Our FEMMES Fall Capstone will occur on **Saturday, November 14th** at the chemistry building at the University of Michigan. Register using the web address below or get the link on our facebook page or website by **November 1st**: https://www.eventbrite.com/e/femmes-fall-capstone-event-registration-18863775059
- The FEMMES team recently participated at the "Why Not Wednesday" event in August at the Arbor Hills Shopping Center. One activity included a demonstration about cloud formation and how that relates to weather patterns such as lake effect snow and wet and dry sides of mountains. The other activity was a tasty one where kids learned about glaciers and their role in forming the great lakes using ice cream, oreos, M&Ms, and other goodies.
- FEMMES will be at Ypsilanti District Library on Thursday, November 5th from 6:30-7:30 putting on an evening of STEM activities.
- Look on our website and Facebook page for announcements for future FEMMES events as they are scheduled.

Media:

- FEMMES now has a promotional video!! Check it out on our website, facebook, or on youtube by searching "Females Excelling More in Math, Engineering, and the Sciences (FEMMES): UMICH". The video is the product of great work done by Melissa Holt and gives you an inside look at some of the work we do through our capstone events. A big thanks to Melissa for the hard work in making such an awesome promo video.

Fundraisers:

- We currently do not have any fundraisers officially scheduled, but we are organizing a one for Pizza House so be on the look-out for that. We are also always looking for donations and sponsors so if you would like to contribute to our mission, go to our website to find out how or email us.

Photo Collage: Photos from the Spring Capstone