



The Goizueta-Woodrow Wilson Enrichment Microgrant Program Symposium

Presentation Packet | June 1, 2019



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Goizueta-Woodrow Wilson Enrichment Microgrant Program

The first class of Woodrow Wilson Georgia Teaching Fellows was named in 2015, with the Woodruff Foundation's support, to create new science and math learning opportunities in the state's high-need schools. Soon thereafter, with extraordinary generosity, the Goizueta Foundation established the Goizueta-WW Enrichment Microgrants, a complementary program for WW Georgia Teaching Fellows that has become Fellows' most powerful resource for creating those learning opportunities.

The Goizueta-WW Enrichment Microgrants allow WW Georgia Teaching Fellows to write proposals for small amounts of funding to attend or present at professional conferences, buy teaching materials for their classrooms, or complete community-based service learning projects. The microgrants have been enormously successful, as evidenced in the summaries of Fellows' projects that appear in this booklet.

As the Fellows make clear in their reports, the outcomes have not only strengthened their own teaching and sparked their students' interest in the STEM fields (science, technology, engineering, and math), but have also provided new resources for their colleagues and schools. The Goizueta-WW program includes workshops where Fellows can hear about the work they have all done with the Goizueta-WW funds; the most recent of these was the symposium held in Atlanta. Such gatherings provide another opportunity for Fellows to learn from each other, share best practices, and take home new ideas and energy.

The Woodrow Wilson Foundation takes tremendous pride in these Fellows, who have committed themselves to classroom excellence for their students and the communities they serve. The Goizueta Foundation has given them a truly exceptional opportunity to enrich their students' learning—and in fact other WW Teaching Fellowship states have since adopted the microgrants model, as a result of these successes. Enjoy learning more about these Georgia Fellows' impressive work as they help thousands of young people create new futures and address Georgia's—and the nation's—achievement gap.

List of Projects by Fellow

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John Alberts (Georgia State University)	8
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For questions or more information about the Goizueta-Woodrow Wilson Enrichment Microgrant Program, please contact wwgatfmicrogrants@woodrow.org.

Conferences

NCTM: Bringing New Ideas into the Math Classroom

by Mark Kagika, Brian Moler, and Marcus Stevens

2015 Cohort | Columbus State University | Marion County Middle High School (Buena Vista) | Discovery High School (Lawrenceville) | East Coweta High School (Sharpsburg)



From left to right: Mark Kagika, Dr. Christine Darden, and Marcus Stevens after the opening session "On Their Shoulders."



One of the routines explored in one of the sessions attended at the conference, Estimation Monday, empowers students' number sense and problem-solving skills.

SUMMARY The goal of our project was to participate in three days of professional development at a regional conference organized by the National Council of Teachers of Mathematics (NCTM). Our goal was to learn from other mathematics teachers from around the country, which helped us bring new ideas into the classroom, as well as reflect upon any current classroom practices that we could improve upon. We used the microgrant funds to attend the NCTM regional conference in Kansas City, MO. The conference featured eight essential topics, from teaching and learning to celebrating differences and diversity in mathematics education. Attending the conference enabled us all to receive access to knowledge and innovative ideas that we were able to immediately use in our classrooms.

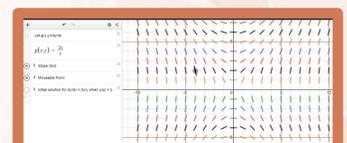
IMPACT ON STUDENTS *Creating Collaborative Classrooms: Engaging Students in Meaningful Learning of Mathematics* focused on collaborative learning within the mathematics classroom. After this session, we started focusing more on grouping within the classroom and the collaborative process. From this, we have seen students take more ownership in the learning process and have also seen greater student engagement within the classroom environment. Mark hopes to implement routines such as *Estimation Monday* and *Thoughtful Thursday* that he learned from attending *Empowering Critical Thinking for All: Exploring Routines That Engage Every Student*. Brian hopes to continue to focus on building a collaborative learning environment. Marcus plans to continue to enhance student learning by implementing technology in the classroom. Exciting methods were cultivated by attending the NCTM conference sessions, such as *Exploring the Connection between Recursive Sequences and Composition of Functions* and *Desmos for Calculus: Animating All the Greatest Hits*. *Texas Instruments* and *Desmos.com* activities have provided new ways to explore mathematics: extending basic recursion modeling to difference equations and differential equations. Visualizing functions through graphs and animations has helped to clarify understanding and to make math fun to learn.

EFFECTIVENESS IN TEACHING The funding has impacted our teaching in various ways. One of the sessions that Mark attended, *Empowering Critical Thinking for All: Exploring Routines That Engage Every Student*, focused on establishing routines that promote a

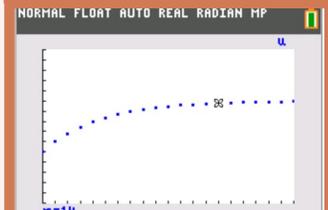
growth mindset, critical thinking, and risk-taking in students. These routines included such activities as *Estimation Monday*, in which students were shown a visual, such as a picture of a cup filled with almonds, and asked to estimate how many almonds there were in the cup. There were other sessions at the conference that provided access to other types of resources. In general, the funding enabled us all to gain access to resources as well as the experience of other passionate mathematics educators.

IMPACT ON EDUCATORS Upon returning from the conference, we have had many informal conversations with other Woodrow Wilson Teaching Fellows regarding strategies and knowledge gained from attending NCTM. Mark and Marcus were part of a Fellow panel hosted at Columbus State University and were able to share some of their experiences that were gained from attending the NCTM conference. Brian shared his experience with his fellow colleagues within the math department and during a few of the math department meetings at Discovery High School. Additionally, Marcus shared the gathered conference resources with his math department colleagues at East Coweta High School.

WORDS OF ADVICE Document everything. Reflect on the sessions you attend as soon as possible. Find a way of sharing what you have gained with other teachers and colleagues. Keep in touch with other educators that you have connected to at the conference. Follow up with the session leaders to obtain any information or documents you were not able to get during the conference. If possible, map out any sessions of interest prior to attending and collaborate with anyone accompanying you to the conference so that you are able to share materials, resources, and session notes. Leaving the classroom for a few days to attend a conference can be difficult to organize and can lead to feelings of guilt, since you are leaving your students in the middle of the semester. Our NCTM conference attendance has shown us the importance of learning new techniques. We know that our students, present and future, will greatly benefit from the knowledge, experience, and positive energy we gained from attending.



Slope Field Generator created on Desmos.com to help with teaching this Calculus topic.



Graphing Calculators are powerful tools that can be used in teaching mathematics and science at all levels to show the behavior of real world data and can bring functions to life.

NCTM and GMC: Learning Innovative Math Teaching Practices

by Linzi Bullard, Steven Eicholtz, Bailey Kirk, and Aneta Galazka

2018 Cohort | Georgia State University | Cedar Grove High School (Ellenwood) | Arabia Mountain High School (Lithonia) | Maynard Jackson High School (Atlanta)

SUMMARY The goal of our project was to provide us the opportunity to learn about innovative, effective teaching practices for mathematics teachers. As we are currently in our clinical placements, our teaching experiences are limited to what we learn in our college courses and our clinical experience. In order to expand our knowledge and skills for teaching mathematics effectively, we decided to apply for the Goizueta-Woodrow Wilson Enrichment Microgrant so that the four Georgia State University WW Teaching Fellows in math could attend the Georgia Mathematics Conference (GMC) and the National Council of Teachers of Mathematics (NCTM) Annual Conference. During our summer 2018 mathematics pedagogy courses, we were introduced to various resources from NCTM, which inspired us to attend these conferences in order to learn teaching strategies from experienced mathematics teachers and to network with mathematics teachers from across the country. Ultimately, our goal is to implement the resources, skills, and knowledge that we obtained from these conferences to become effective mathematics teachers for our current and future students.

IMPACT ON STUDENTS We expect to see a new excitement and interest in mathematics in our students after attending this conference. Each of us were inspired by presentations to try something new and engaging in our class this year. Furthermore, we expect our new students next year to benefit directly from the knowledge, resources, and encouragement we received from the conference. Some possible implementations include student-created digital portfolios to demonstrate creativity and mastery in mathematics; coding and robotics inside of the classroom aligned with common core standards; formative questions and assessments to guide instruction; and math talks to strengthen conceptual understanding and number sense. We plan on increasing the use of online tools for engagement and assessment, and we learned how to use them effectively in hands-on workshops at the conference. Overall, our classrooms will become more student-centered and culturally responsive after attending this informative conference.

EFFECTIVENESS IN TEACHING Both GMC and NCTM supported our teaching practice directly. At GMC, we were able to bring back practical and authentic classroom resources that enabled us to engage our students and innovate our classes. The conference grounded our teaching practice in research-based practices that encourage student-centered learning. We strengthened our assessment abilities at this conference and learned how to align activities to standards and formatively assess learning targets. This was a practice that we were able to use in our classroom while we taught independently. The NCTM conference gave a broader perspective on best teaching practices across the nation. We felt our ideas and goals for our future classroom were solidified. At this conference, we began to shape the important routines and structures that we want to include in our classroom next year. The impact that this experience truly had on our teaching is yet to be fully seen, but we each left with a brand new set of skills, goals, ideas, and plans. We are energized to begin our career strong in STEM because of this conference.



Georgia State University Math Teaching Fellows at 2019 NCTM math conference in San Diego. We LOVE math!

IMPACT ON EDUCATORS From GMC and NCTM, we were able to bring back not only ideas for the classroom, but inspiration of positive teaching practices. I (Linzi) have been able to discuss my experience at GCM with the math department to bring these new ideas back to our high school. Within the classroom, I have been able to implement some of the ideas that I saw, such as math talks, but the important thing is being able to show and describe what I am doing with other teachers in the building. By spreading this knowledge, other teachers are able to see new teaching practices. We also want to build on this knowledge by having professional developments next year, focused on some of the topics that we have been able to not only learn about, but use within our own classroom.

WORDS OF ADVICE Always go to conferences/professional developments because we never stop learning. You never know what you will get from the conference, so by going in with an open mind and wanting to learn about everything you will be able to bring something back with you. Students change constantly, and teachers need to grow with them if they are expected to reach the students, and the best way to do this is through learning.

Fresh Teaching Ideas at GSTA and NSTA

by Laura Rogers, Mike Sommer, and Caitlin Hochuli

2016 Cohort | Mercer University | Fayette County High School (Fayetteville) | Salem High School (Conyers) | Mary Persons High School (Forsyth)

SUMMARY As a Woodrow Wilson Teaching Fellow, I (Laura) was able to attend many different conferences, which opened my eyes to the world of professional development. Conferences are the best experiences and I was looking for a way to continue attending. The Goizueta-Woodrow Wilson Enrichment Microgrant allowed me to attend and present at the Georgia Science Teachers Association (GSTA) conference. I was also able to bring one other Woodrow Wilson Teaching Fellow and another teacher from my school. The microgrant also allowed me to attend the National Science Teachers Association (NSTA) conference in St. Louis with two other Woodrow Wilson Teaching Fellows. Because my original goal for the grant was to improve my teaching practice, my students are the ones who benefit the most.

IMPACT ON STUDENTS While I may originally sign up for professional development with the intent to learn from other teachers for my own professional development, my students are the ones who receive the greatest benefit. At both GSTA and NSTA, I was able to learn from some of the most engaging and effective science teachers who implement innovative ideas in their classrooms. In turn, I am able to bring so many new and creative lessons back to my own classroom. Because of what I learned at the conference, my students are able to actively engage in the science classroom in a way they never have been before. They are actively reading material that they would not have in the past. They are participating in new labs. They are working through real-world problems. None of those lessons would have been possible without the support I received while at GSTA and NSTA. I cannot wait to implement more ideas into my curriculum next year.



We had a great week learning in St. Louis at NSTA!

EFFECTIVENESS IN TEACHING My teaching always improves immensely after a conference. I come back with a new sense of purpose and excitement. Both conferences offer different experiences, but I was able to learn so much at each one. At GSTA, I was able to connect with Georgia teachers who are engaging their students in innovative lessons. One of the main themes of GSTA was literacy, which I have always found difficult to implement in a science classroom. The conference equipped me with skills to develop lessons that will help my students' reading. At NSTA, I focused on improving my biology course for next year. I know that I am going to make sure that my students have a clearer and deeper understanding of genetics and DNA next year.

IMPACT ON EDUCATORS This enrichment program is an amazing experience not only for me, but also for so many other educators. Two other Woodrow Wilson Teaching Fellows from different counties in Georgia and a teacher from my current school were able to attend the conferences with me. We all teach different subjects, from environmental science and biology to physics. This allowed us to gain knowledge that we could bring back to our respective departments. As a current biology teacher, I was able to share and bring back so many new ideas that we plan

to implement as a team. While this grant only funded five educators to attend conferences, so many more benefited from our ability to share information.

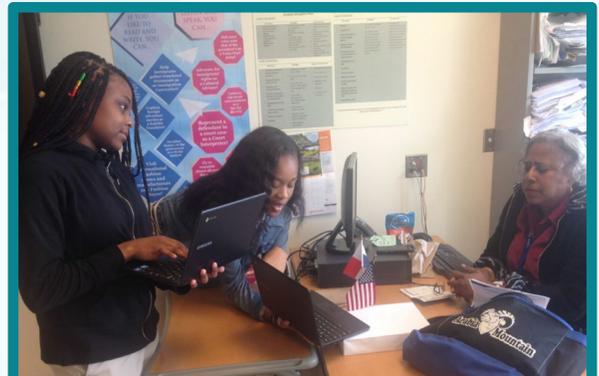
WORDS OF ADVICE I would advise all teachers to write grants, especially to attend conferences. You never know what you will learn or what you can bring back. Often, school districts do not have funding to send teachers to conferences, but these have been some of my most valuable experiences. I would not be the teacher I am today without the Goizueta-Woodrow Wilson Enrichment Microgrant.

Classroom Materials

Using Chromebooks for Student-Led Research by Bridget Curren

2019 Cohort | Georgia State University | Arabia Mountain High School (Lithonia)

SUMMARY The goal of this project was to create a student-led research project utilizing Chromebooks. The inspiration for this proposal came from the lack of available technology for students in high-need schools and the necessity of Chromebooks in the classroom. Chromebooks are a powerful tool for learning. However, in cases when students receive them through a school grant, they often break, chargers are misplaced, or the insurance fees to replace them are too high. For this reason, it is essential to have a set of Chromebooks in the classroom for all the students who cannot afford them, have a broken Chromebook, or had theirs lost or stolen. The last objective of this project was to demonstrate how students can use Chromebooks to lead their own research projects.



Students interviewing staff about recycling habits.

IMPACT ON STUDENTS The students in this study led their own research project regarding recycling at area high schools. They identified the topic on their own, devised their research methods on their own, and analyzed the results. As the teacher, I stood by only to guide. Students gained skills and aptitudes that will benefit them in STEM classes, or for a career in STEM. Further, they gained proficiencies in acquiring data, analyzing data, and making conclusions/future recommendations. Their self-esteem and confidence increased as a result.



Students making a Google survey about recycling to collect data.

EFFECTIVENESS IN TEACHING The funding greatly supported our use of Chromebooks in the classroom. Prior to the funding, we had a mixture of students without Chromebooks, students with non-working Chromebooks, and students needing to borrow chargers. The result was a major loss in class-time instruction due to facilitating/organizing Chromebook activities. It has been nearly impossible to use computer simulations as classroom activities, since many students are missing Chromebooks or have non-working devices. This grant has greatly enriched our classroom by allowing students to borrow fully functioning Chromebooks to complete their work. For the independently-led research projects, these students would not have been able to conduct their surveys, collect results, or interview teachers if not for the powerful tools found on their Chromebooks.

IMPACT ON EDUCATORS I plan to attend the Fernbank Development Seminars in my city annually in order to share information and results with other teachers.

WORDS OF ADVICE I would recommend finding an area of focus early so that your students have plenty of time to complete their research.

Goizueta–Woodrow Wilson Enrichment Microgrant

Laptops for Simulation Labs and Assessments

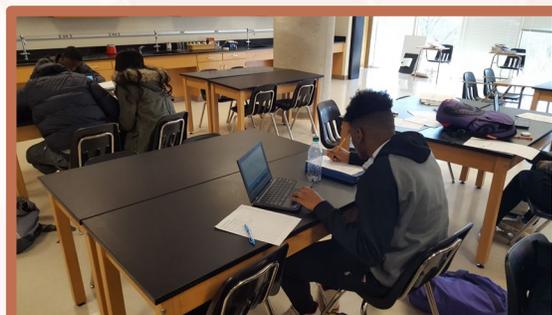
by Daniel Thornton-Weyrauch and Megan Larisch

2018 Cohort | Georgia State University | North Atlanta High School (Atlanta)

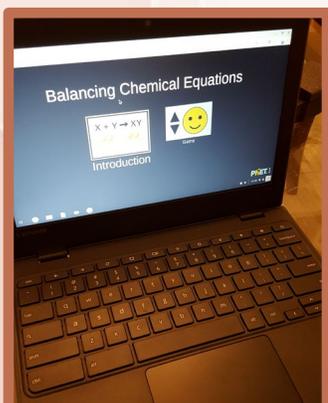
SUMMARY The goal of the project was to have durable laptops available for the classroom. In our clinical placement, the math department had priority with the Chromebook racks that the school had available. The goal of the project was to introduce simulation labs into the classroom and computer-based formative assessments.

IMPACT ON STUDENTS The main difference in the simulation labs we ran on the Chromebooks and student labs we ran offline was the quality and availability of data. Students struggled to work with data in traditional, in-person cookbook labs, because it took so long to collect data. By the time we had finished two 90-minute lab periods, students were focused on completing their written lab reports for a grade and were less interested in data collected. The simulation labs allowed students to work directly with data without being distracted by writing lab reports.

EFFECTIVENESS IN TEACHING Our teaching has improved, as we are now more familiar with the strengths and weaknesses of computer-based labs and assessments. We have had months of experience in the technical aspects of making simulation labs work. We have also had experience in student perceptions of computer-based labs and assessments. We learned that having a mix of technology available is probably best, as students have their own preferences, and it's easier to support eight Chromebooks than sixteen. We have learned that students don't like having a grade attached to any assessment that they can't go back to and correct later. We also learned that HTML 5 simulations are worth a great deal more than flash simulations, which is not an obvious difference at a first glance as an educator.



Students working on a PhET simulation lab.



The landing page of a PhET simulation.

IMPACT ON EDUCATORS

We have shared computer-based labs, technology-based formative assessments, etc. with other teachers in my Professional Learning Community. At some point, I (Dan) plan to do an action research paper on technology-based assessment, probably after my first year as a public school teacher.

WORDS OF ADVICE

Make sure to take educational license prices and general license prices into account when pricing out purchase of technology. Many software and computer companies have special prices for educational organizations. Unfortunately, as a microgrant recipient, we are not buying the software as an educational organization, so we do not qualify for standard education rates. This problem prevented us from purchasing the management software we intended to buy, which has made integrating the Chromebooks into the classroom harder.

Goizueta–Woodrow Wilson Enrichment Microgrant

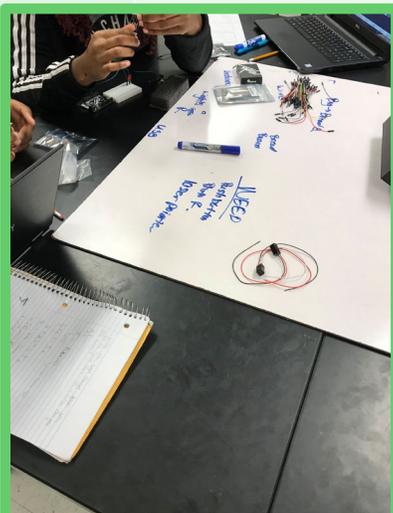
Materials for Electrical Engineering and Computer Science Projects

by John Alberts

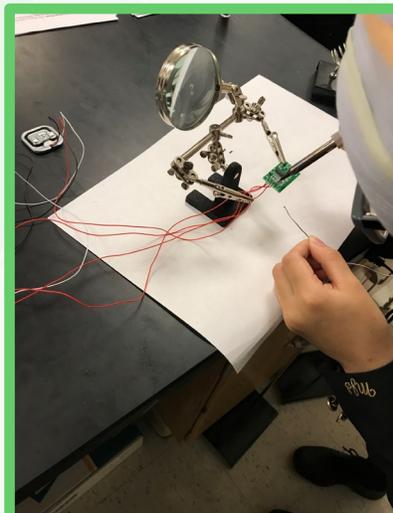
2017 Cohort | Georgia State University | Dekalb Early College Academy (Atlanta)

SUMMARY I wrote this project proposal to obtain materials that would allow students to engage in electrical engineering and computer science projects. I hoped that, through engaging in these projects, students would see engineering and computer science as possible career paths for themselves. Also, my goal was to grow my students' interest in engineering and computer science through examples of what can be done.

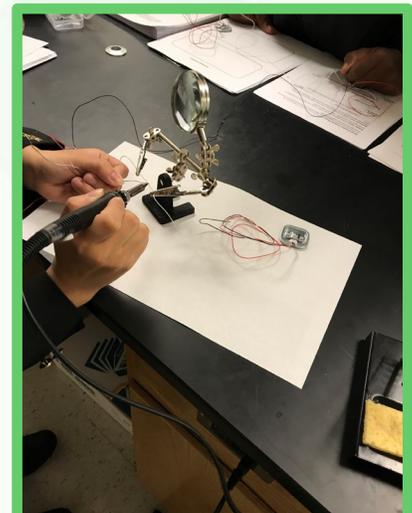
IMPACT ON STUDENTS Students who previously said they were not interested in engineering or computer science majors/careers have made comments such as "I'm going to go into engineering" or "I can do that" (in regards to fixing a circuit arrangement). Many students now have a better understanding of engineering as a process, and not just as constructing or building something. Students have experienced the process of redesigning something to meet a need, as well as the process of troubleshooting and debugging hardware and software errors. They have also seen and used equipment and code that is used in college-level engineering and computer science classes.



Students laying out the materials they have and planning how to start their project.



Student soldering load cell wires to the PCB board of a load cell amplifier.



Student soldering wires of load cells together to make a scale.

EFFECTIVENESS IN TEACHING In implementing this project, my approach to teaching the concepts of electricity and magnetism has shifted from a focus on content to a focus on application. Instead of solely teaching a concept so that students would understand the concept itself, I am focusing on teaching the concepts so that students would grasp them as a means to better execute their projects. Teaching the concepts along with the projects makes it easier for student to understand the application of the theoretical content.

IMPACT ON EDUCATORS I plan to share ways in which physics teachers can integrate engineering projects with content in their classes in future district professional development meetings and local physics teacher meetings. I also plan to put together project files that I would be able to share with teachers through Google Drive or email.

WORDS OF ADVICE It helps a lot for students to have their own laptops to download the IDE software and upload it to the Arduinos. It would help to have students do small coding assignments online using C programming prior to working with the Arduinos. It may be helpful to only have a select number of groups work on the project at a time; managing multiple projects at once can be difficult when multiple groups are stuck and need assistance to move forward.

Goizueta–Woodrow Wilson Enrichment Microgrant

Teaching Coding with Arduino Kit Sets

by Mars Berwanger

2017 Cohort | Kennesaw State University | Wheeler High School (Marietta)



Engineering students collaborate on unique projects of their own creation.

SUMMARY The funds from this Goizueta–Woodrow Wilson Enrichment Microgrant were used for 50 Arduino kit sets. These Arduinos allow for students to learn coding skills as they create unique and creative projects. Having 50 sets enabled every student in the classroom to work on his or her own project during structured activities, and also allowed each pair of students in my classes to have their own set to use for long-term projects.

IMPACT ON STUDENTS Through this project, I have seen a measured increase in interest in coding, STEM, and creativity. Students have created a range of fun and unique projects, including lighting for a gingerbread house replica of the school, a homemade musical synthesizer, a “SMART” solar panel that tracks the sun’s position, a karaoke machine, a lie detector, ultrasound to detect distance of objects, an interactive touch-table that lights up and changes colors when different squares are touched, speed control for a motorized couch, and an EMG-controlled robotic hand. For

students who wish to have a career in STEM, coding is an essential skill. Because they are exposed to it in high school, it will give them a leg up in their future education and career. For students who have not shown an inclination toward STEM, using Arduinos—which are relatively beginner-friendly and can be used for fun projects like those listed above—empowers them to know that even if they don’t have a strong math background, they can be successful at STEM in a way which they previously did not expect. The journalism class at Wheeler High School did a segment on one of the Arduino projects (the gingerbread house). The video segment is published online on YouTube.



One of many projects students worked on with the help of Arduino kit sets.

EFFECTIVENESS IN TEACHING The funding allowed for my classroom to have 50 Arduino kits, which are the building blocks for how I teach my students coding skills (a highly critical and marketable skill for future STEM workers). They are a critical part of a large number of unique and student-directed projects. Even more so, these Arduino kits can be reused semester to semester, so their impact will be beyond just this one year.

IMPACT ON EDUCATORS Wheeler High School has a large emphasis on collaborative projects. Of the projects which my students completed with Arduinos, a large number included them physically getting out of the classroom and collaborating with students from other classes. One such example of this is the gingerbread house replica of the school, where architecture, culinary, and engineering students all worked together to create an exact replica of the school using gingerbread. An Arduino from this kit was used to control the blinking and color-changing lights that my students mounted throughout the replica.

WORDS OF ADVICE Focus more time on getting the students interested in a specific project and less in structured instruction on coding. I started a unit with these Arduinos where I had structured lessons to teach different coding aspects (such as for/while loops and if/then statements). While I did find this to be a necessary part of the process, the students who were most successful and who had the biggest impact from the Arduinos were those students who got involved in unique and creative project of their own design. With Arduinos in particular, there is an abundance of resources and skeleton codes which can get a student started on a project. Assuming a student has a basic knowledge in coding, I found the students who became emotionally invested in a project took a remarkable amount of individual initiative to dig deeper in their coding and other learning.



Students collaborating on engineering projects.

Interactive Explorations with PASCO Probes

by Colin Cederna

2018 Cohort | Piedmont College | Lanier High School (Sugar Hill)

SUMMARY The Goizueta-Woodrow Wilson Enrichment Microgrant Program allowed me to transform my learning environment at Lanier High School. I teach chemistry and environmental science, and I used the funds to purchase a plethora of PASCO probes. The probes turned ordinary activities, such as boiling saltwater, into interactive explorations. Almost every experiment incorporated at least one of the probes, allowing the students to connect wirelessly to the PASCO probes to collect data. The probes give the students a live stream of data directly to their phones—a way of turning the distracting social media-filled phone into something positive and useful in the classroom.

IMPACT ON STUDENTS The program allowed my environmental science students to track the health of our school's stream for eight continuous months. We watched its pH become more basic as the months went by, its temperature drastically shift with the seasons, and the conductivity remain fairly constant. In chemistry, the young chemists used the probes to measure temperature changes during extreme exothermic and endothermic reactions. They also used the probes to calculate the calories in a Cheeto and the strength of carbonic acid that they created themselves. The integration of the probes into my classroom has increased overall interest in STEM activities. The students enjoy working with the probes; they connect in seconds without any instruction, they care for them, and they clean them at the end of each lab. I hope to continue integrating the technology into my instruction as I transition from chemistry to biology in the upcoming school year.



In the field, gathering stream data as a team.

EFFECTIVENESS IN TEACHING This enrichment program has enhanced my teaching by expanding my instructional arsenal. Students hate monotony, and so do I. If school is the same, day after day, it gets boring and people lose focus and interest. I have discovered that using a wide variety of instructional strategies keeps students more engaged and curious. The PASCO probes have opened up another academic avenue for the students. It gives them hands-on experience with modern technology that is used by chemists and environmental scientists in the lab/field. The funds have allowed me to flip my classroom: the students take ownership and control of their learning, occasionally using me as their guide and support system. When the probes are out, students are engaged in their learning, and that is what is important in my classroom.

IMPACT ON EDUCATORS I offered to share my probes with other chemistry teachers and biology teachers, but no one took me up on my offer this school year. Hopefully, in the coming years, my coworkers will become open to new instructional strategies and discover the magic of PASCO probes. I also plan on having my students present their stream study to the local environmental commission next year. This will connect my classroom to the local community.

WORDS OF ADVICE Establish strict rules from the beginning, because the probes are expensive and can be broken if students are careless. Be creative and don't be afraid to try new experiments. Let the students fail once in a while in the lab, allow them to reflect on the experiment, fix their mistakes, and try again.

Goizueta–Woodrow Wilson Enrichment Microgrant

Integrating Environment-Related Activities into Math Classes

by Michael Peterson

2017 Cohort | Georgia State University | Arabia Mountain High School (Lithonia)

SUMMARY Arabia Mountain High School (AMHS) was founded as an EIC (Environment as an Integrating Context) certified school, which follows the educational model developed by the State Education and Environment Roundtable (SEER). Given the premise of environmental integration in course content as a foundational requirement for the existence of the school, there is an expressed desire to expand EIC engagement in my precalculus classes.

IMPACT ON STUDENTS Students enjoyed the hands-on experiences, and in some cases, indicated that they carried information to their families. The results of the research also indicated that, as hoped, students were less likely to support the overuse of environmental resources and more interested in preserving environmental resources.



Locating the “plastic island” using data and formulas.



Identifying an object at location with bearing data.



Finding distance and angle of depression.

EFFECTIVENESS IN TEACHING The funding was essential in supporting my efforts to engage students in experiential learning and lab-type activities. Using tools to record data that is applied to solve problems leads to higher-order thinking, which is certainly one of my goals in the classroom.



Identifying an object and providing bearing data.

IMPACT ON EDUCATORS In addition to developing the necessary materials to share the project with Woodrow Wilson Teaching Fellows, I will share the results of this project with the math department and EIC instructors, with the goal to give an example of subject content integration within the EIC model. The primary results of this research are expected to be highly data-driven and I intend to publish them in a report or a presentation to be possibly shared at a conference.

WORDS OF ADVICE As a new teacher, I was unaware of some of the scheduling, logistics, and administrative issues that I would encounter. This required revisiting my lesson plans several times, as well as scrapping some aspects of my plan. As an action research project, this would have been better suited for a second- or third-year activity.

Dissection Kits and Lab Supplies for Experiential Biology Instruction

by Derikson Rivera

2016 Cohort | Piedmont College | Dr. Martin Luther King, Jr. High School (Lithonia)

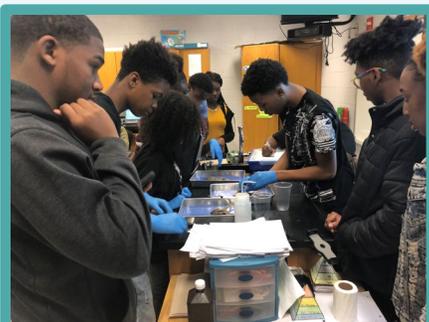
SUMMARY This project pursued the implementation of STEM-related laboratory supplies and Carolina Scientific® specimen dissection kits to augment experiential learning instruction in my biology classroom. The project targeted directly a population of 212 co-taught students, with a homogeneous African-American ethnic distribution. Approximately 35% of the students have IEPs and 5% have 504 plans. This project specifically aimed to foster the growth of STEM dispositions, discipline, and content knowledge across DeKalb County Schools District Region 5 cluster.



Students performing frog dissections.

IMPACT ON STUDENTS For sophomores coming from Salem Middle School and Arabia Mountain High School, this project enriched the experience of co-taught biology and IB biology. It allowed students to perform dissections of non-live and perishable preserved specimens—specifically, frogs, pig hearts, sheep brains, and pigs obtained from Carolina Scientific®. Moreover, students performed standard operating procedures to manipulate dissection equipment, ranging from rulers, replaceable-blade scalpels, dissecting needles, dissecting forceps, trays, and scissors. Evidence suggests that these experiences created a positive impact on students' level of engagement, motivation, and interests in STEM and overall life science curriculum. Finally, I was able to establish rapport and to shift a significant number of students' perception towards the biology course. These changes, which were also noticed by school-level administrators, were evidenced by students' feedback on solid positive teacher-student relationships in their co-taught biology sophomore course.

EFFECTIVENESS IN TEACHING The 2018-19 Goizueta-Woodrow Wilson Enrichment Microgrant has supported my teaching by providing me the opportunity to continuously expose high-need schools' STEM students to novel instructional technology and unique experiences in order to engage them in science instruction. This project allowed me, for the first time, to instruct science laboratories incorporating dissections of non-living perishable preserved specimens in high school. In addition, now I have gained the experience to plan, manage, and monitor high school students when participating in these types of lessons. Moreover, the funding allowed me to establish positive teacher-student relationships, which I used as a hook to encourage students to participate in extracurricular academic activities at Dr. Martin Luther King, Jr. High School.



IMPACT ON EDUCATORS I have been able to disseminate and share the resources provided by this microgrant with the Dr. Martin Luther King, Jr. High School science subject team, Samone Robinson and Natasha Strawbridge. Specifically, students from the IB biology and CP biology course within the school performed a gallery walk and observed sophomore students performing dissections of specimens. Moreover, I have worked collaboratively with Dr. Patricia Hood, my gifted endorsement facilitator and retired teacher from Salem Middle School, who has provided me continuous feedback to manage and work with these students.



Dr. Martin Luther King, Jr. High School biology sophomores performing frog dissections.

WORDS OF ADVICE Establish standard operating procedures, assign roles to students, have an additional faculty/staff member in the classroom, and comply with biohazard disposal regulations.

A Fish Tank: Teaching Science and Responsibility

by Marshai Waiters

2016 Cohort | Kennesaw State University | Marietta Middle School (Marietta)

SUMMARY The goal of my project was to incorporate more opportunities for hands-on learning with my students. This included plant light banks, materials for eco-column construction, and a 38-gallon fish tank. I wanted the students to be able to interact with materials while they learned science, and also learn responsibility through maintaining the new fish tank.

IMPACT ON STUDENTS Students were able to participate in setting up the fish tank in the front office, as well as introducing the first fish that we put in. Since then, I have had several students participate in maintaining the fish tank, including feeding and weekly water changes. Students were also able to use the light banks in a lab to learn about photosynthesis using the Elodea plants. Hands-on learning is something that has always interested students, and something that they look forward to in science. I plan to reflect on this year and design ways to continue to implement these materials into my instruction for next year.

EFFECTIVENESS IN TEACHING Receiving this funding has allowed me to purchase these materials to use in the classroom, and it has also motivated me to brainstorm different ways I can incorporate the materials into my lessons. As an educator, having an open mind and always being willing to learn and take risks in using new strategies in the classroom is imperative in the realm of education. With the fast pace changes in our society, as educators we have to keep up in order to teach and reach students in ways that they require.



Students assisting with introducing new fish to the fish tank.

IMPACT ON EDUCATORS I have been able to share my ideas with my school staff, as the fish tank has been housed in the main office of the school. This has been positive, because parents, younger students, visitors, and other students can observe the fish tank when they enter our school daily. Within my Professional Learning Community, I have been able to inform my instructional coach and team partner about the science supplies and my intent for utilizing them with classroom instruction.

WORDS OF ADVICE I would give the advice to take risks in implementing new ideas and projects to further enhance learning for our students. It is necessary in a world where our students have so much access to technology; it allows them to connect to the content in a way that will impact them beyond the surface.

Incorporating Whiteboards into the Classroom

by Diane Overton

2017 Cohort | Kennesaw State University | Campbell Middle School (Smyrna)

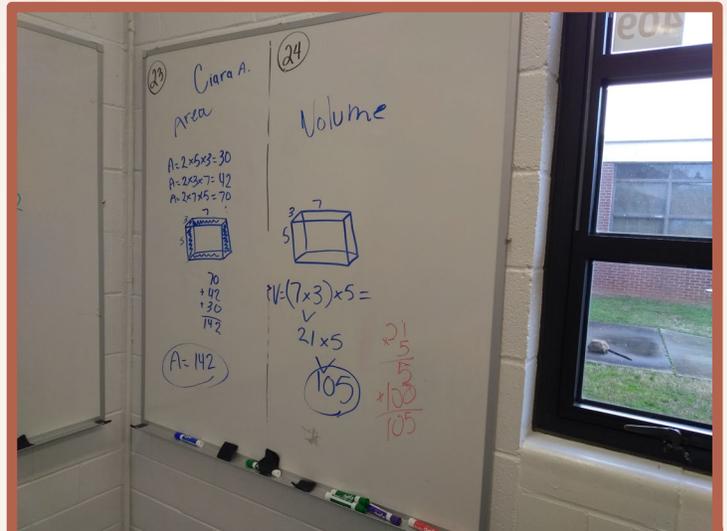
SUMMARY I applied for the Goizueta–Woodrow Wilson Enrichment Microgrant to purchase whiteboards for my classroom. My goal is to be able to use these whiteboards to assess my students more easily, provide immediate feedback, and modify my lessons to meet students’ needs. I hope to grow my students’ problem-solving abilities. I was inspired to write this proposal because I want to provide my students with as many opportunities as possible to grow their math skills.

IMPACT ON STUDENTS As a result of having these resources available in the classroom, my students increased their procedural knowledge and their active engagement with the math content. Some positive student outcomes that I observed were that students engaged during stations and group work and they demonstrated knowledge of new material.

EFFECTIVENESS IN TEACHING Having these resources available in my classroom has widened the possibilities for learning activities that I can use with my students. I am able to incorporate stations and group work into our lessons more easily. I am also able to assess the overall understanding of the class more easily by looking at the work that students are doing on their boards. This allows me to modify my lessons based on students’ needs.

IMPACT ON EDUCATORS The school where I teach is making an effort to outfit more math classrooms with whiteboards on the walls for all students. As more teachers are teaching in classrooms like this, I will be able to share the knowledge I have gained about how to incorporate the boards into daily lesson plans. I can also share what I have learned about teaching students the proper and respectful use of these materials.

WORDS OF ADVICE I would advise other educators to spend time teaching the procedures for using the whiteboards, markers, and erasers properly and respectfully. Teachers should post clear rules for using these materials and enforce the rules consistently. I would also advise teachers to number the boards, assign them to individual students, and post the assignments in an easily accessible place in the classroom. Teachers should incorporate the whiteboards slowly at first, and then incorporate new instructional practices one-by-one, such as warm-ups, closings, stations, and group work.



Students worked on the whiteboards to prepare for our Geometry Unit Test.

Increasing Engagement with VR and Graphing Calculators

by Starrissa Winters

2017 Cohort | Kennesaw State University | Cooper Middle School (Austell)

SUMMARY In this project, my main focus was to introduce physical science and STEM students to new instructional resources (standalone VR systems, and the Texas Instruments (TI) Nspire and Innovator systems), with the goal of increasing student engagement/interest, creating an academically challenging environment, and deepening understanding and connections that can be observed in student achievement data. The TI technology, both TI-Nspire and TI-Innovator systems, allowed students to experience a unique, hands-on approach to learning science, while promoting inquiry-based instruction and exposure to advanced technology. The TI-Innovator system allowed my students to collaboratively explore the principles of the engineering design process through vetted STEM projects that relate to our physical science standards. Lastly, comprehensive studies and reviews on VR in the classroom support the idea that VR-based lessons leave students with memories and experiences that help visualization and encourage understanding with even the most complex of educational subjects. All in all, I wanted to give my students an opportunity to use new and innovative technology to explore science concepts in a deeper, more engaging way—like never before.

IMPACT ON STUDENTS In lessons and units using the new resources, students showed increased engagement and improved academic performance (on average, ~10% increase). During whole-group discussion, students often compared the TI-Nspire lessons to PhET lessons on the iPads or desktops; they enjoyed using something different and unconventional. This diverse multimedia pedagogical approach allowed me to implement a differentiated instruction strategy where students could rotate through stations, exploring various resources. Notably, several students thanked me for giving them the opportunity to use the different resources, which never happened with the virtual labs on the iPads or desktops. Although students did not show any statistically significant changes in disposition towards STEM and STEM careers after using the materials, they did ask more thoughtful questions about the technology and what types of careers would lead to the design and production of the technology itself. Moreover, students who were interested in STEM careers before the project were further encouraged and excited about the field.

EFFECTIVENESS IN TEACHING The funding has supported my teaching by allowing me to implement more diverse technology and engaging instructional strategies, such as multiple content-related stations, authentic learning through real-world phenomena, and various differentiation practices. The TI-Nspire system allowed me to quickly connect to all student devices to transfer collaborative activities/documents and perform real-time assessments to monitor student understanding during my TI lessons/activities. I was able to purchase the TI-Nspire App for iPad, Navigator system, and Innovator system.

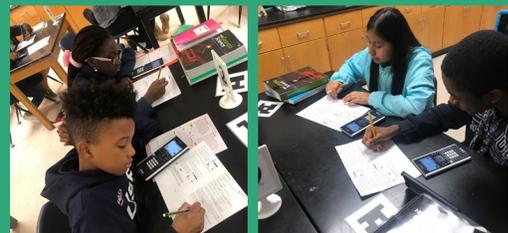


TI-Innovator system: Innovator Hub and Rover—Coding challenge where a student is testing her written code on Rover (robotic vehicle that students program with their TI graphing calculators to explore topics in math, science, coding and STEM)



TI-Innovator system: TI-84 Plus CE and Innovator Hub—DIY Digital Mood Ring Project (Coding and Science)

IMPACT ON EDUCATORS My impact on educators was a major weakness this first year with my materials. Media literacy and implementation require more professional development from teachers than I first considered or expected. It was challenging trying to share as much as I hoped—I would like to improve in this area next year. Planning ahead for the next school year, I will start those conversations earlier and target half-days to demo the materials. Moreover, I now can use screencast recording software to make short videos that are more accessible and convenient when there are scheduling conflicts.



TI-Nspire: Build An Atom activity, where students use TI-Nspires to simulate, observe, and manipulate the variables that affect the structure and, therefore, the properties of an atom.

WORDS OF ADVICE My advice to teachers seeking to implement diverse multimedia in their classrooms is not to try to start too many resources at one time, stay disciplined with your time management plans, and be patient with yourself while learning how to best utilize your tools. I also suggest coordinating any projects that require WiFi with your instructional technology specialist. I was unable to effectively use and mirror the standalone VR headsets without connectivity issues, lagging, and delays, which ultimately eliminated one of the major visions for purchasing multiple standalone VR headsets: using students' perspectives in the headset to “hook” them and bring the content into 3D. Moreover, I was unable to effectively monitor student progress in the lesson or help students when they weren't properly using the equipment. For those interested in implementing VR, I suggest avoiding standalone systems, especially if your county has strict internet access policies for teacher-owned devices—maybe go with the PC-tethered systems instead. The TI-Systems provided easier experiences, but there were also challenges. I suggest teachers use the vetted lessons first and expand on the content to save time and connect with a TI specialist to help you through the buying and implementation.

Goizueta–Woodrow Wilson Enrichment Microgrant



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