GSST SPRING NEWSLETTER 2022

INFORMATION & UPDATES FROM NEW HORIZONS GOVERNOR'S SCHOOL

IMPORTANT DATES:

April 1 - End of Quarter 3 Marking Period
April 4-8 - Spring Break
April 11 - Start of Quarter 4 Marking Period
May 5 - Dual Enrollment Last Date to Withdraw
June 7, 6:00 - 7:30 p.m. Save the Date: GSST Awards & Certificate Program Outdoors at NHREC. Details will follow.

SPRING BREAK - APRIL 4 - 8, 2022

THE SMITHSONIAN CELEBRATES WOMEN IN STEM

#IF/THEN EXHIBIT

Throughout March, the Smithsonian celebrates women in STEM through their If/Then Exhibit: If She Can See It, Then She Can Be It

IF/THEN AMBASS-ADORS

120 life-sized 3-D printed statues of Women in various STEM careers are placed around Washington D.C.

VISIT THE STATUES

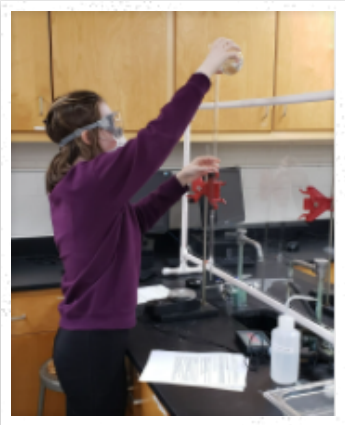
Dr. Patterson stands with the statue of Mercedes Taylor, Assistant Professor in Chemistry/Biochemistry at the U of Maryland, College Park

WHAT'S NEW IN EACH ACADEMIC STRAND?

Biological Sciences:

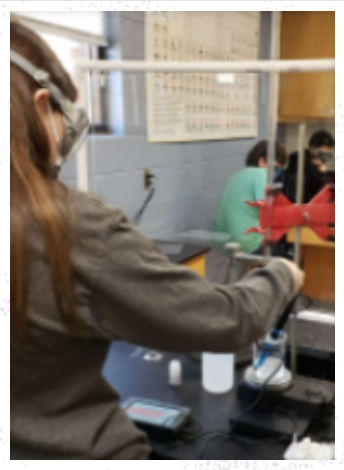
During 3rd Quarter, the chemistry students worked on an extensive unit studying acids and bases in the laboratory. They investigated their properties and examined food items to see which ones were natural indicators. They titrated to determine concentration of a titrant and developed titration curves using pH probes. This allowed students to determine equivalence point. The students are looking forward to studying organic chemistry during 4th Quarter!

Biology students learned about viruses and other non-cellular pathogens, while they detected simulated "viruses" in the laboratory. Students conducted ELISA in a simulation of the Covid-19 Rapid Test, and then conducted a simulation of the Reverse Transcription of the SARS-CoV-2 genome followed a Covid-19 PCR Test using multiplex primers. They then began their study of bacteria, performing Gram Staining as well as Bacterial Transformation with a plasmid and regulating gene expression of bacterial operons.



SETTING UP FOR TITRATION

Kecoughtan HS student, Kaitlyn K., filled the buret with base and determined its concentration through titration.



USING THE PH PROBE

Kecoughtan HS student, Hannah B., used the pH probe to collect data, create a pH curve and determine the equivalence point.

MICROSCOPY OF BACTERIA

Lucy Koak (Bruton HS), Won Heo (Menchville HS), and Madelyn Davidson (Tabb HS, in background) observe their gram stained bacterial smears.

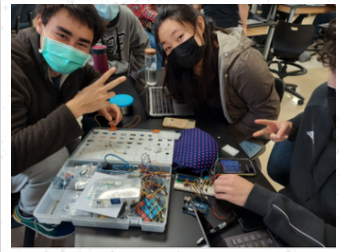
Engineering & Physics:

The engineering physics I & II students are wrapping up the units in Electricity and are about to embark the investigation of magnetic fields and electromagnetic induction. As part of their Electric Circuits unit, students confirmed Ohm's Law while measured the resistivity of brass, aluminum, steel, and copper. They also learned the behavior of RC circuits as capacitors get discharged while measuring the resistance of the multimeter. As the quarter comes to end, students are finalizing their engineering projects for the third quarter: demonstration apparatus for the physics principle of their choice and writing a manual to accompany the device. As part of this project, students use the laser cutter, 3D printer, as well as woodcutting bench, soldering iron, and drill.

Math Modeling Club led by Dr. Kuchina participated through the school year in High School Mathematical Contest in Modeling, The M3 Challenge, and The Modeling The Future Challenge. In each of these competitions, students face various challenges and show off their modeling skills that are being developed in the Engineering Physics course.

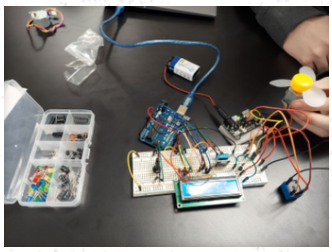
The Academic Challenge Club got 2nd place at the State level and 10th place nationally in the Knowledge Master Open, which qualifies the team for the late spring National Academic Challenge tournament. During the Spring break club will be playing the 3-2-1 Spring Challenge.

In Calculus-Based Engineering Physics III & IV, students start learning quantum mechanics, the physics of very small scales Programming with C++.



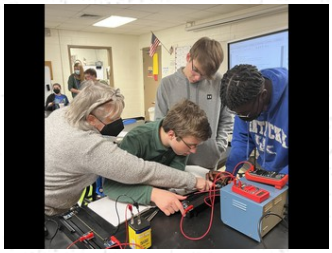
ARDUINO SENSORS

Mark Piatko and Yunseo Chung (both from Grafton HS) are building Arduinos with Air temp and humidity sensors.



ARDUINO FAN CONTROL

Using an Arduino programmed for fan control based on atmosphere.



RESISTANCE & RESISTIVITY LAB

(Left to Right) Dr. Kuchina works with Alessandro Accardi (Grafton HS), Matthew Andrews (Tabb HS), and Joshua Essandoh (Woodside HS).

Computational Sciences:

Students in Computational Physics are learning wave and ray models of light. The nature of light is elusive; sometimes it acts as a way; given a different environment, it then acts as a particle. Or is it both?

We have partnered with Virginia Tech (VT) to bring one of their data science courses to the Governor School This program implements the course from VT in an approachable way for the students and they are guided by Mr. Venturi through the young field of Data Science. This is an exciting opportunity for the students to get a first look at the field that is becoming a foundation of everyday life in academia and corporations.

On Friday, March 18, we participated in the VCU High School Programming contest with two teams. Both teams showed an incredible performance! There were 9 solvable problems in the contest, and only three teams solved them all: TJ 1, TJ 2, and NHREC GSST. One of our teams solved all 9 problems and earned 3rd Place. Our next team solved 8 and earned 4th place.

THIRD PLACE TEAM

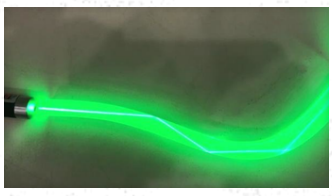
The third place team at VCU's High School Programing Contest

TEAM -- 3rd Place
Wood Hulse — Jamestown HS, WJCC
Kaden Emley — Tabb HS, YCSD
Jacoby Melton — Tabb HS, YCSD
William Chestnut — Bruton HS< YCSD

FOURTH PLACE TEAM

The fourth place team at VCU's High School Programing Contest

TEAM -- 4th Place
Gavin Bowden — Tabb HS, YCSD
Raafat Salib — Grafton HS, YCSD
Dow Draper — Woodside HS, NNPS
Elizabeth Lamb — Tabb HS, YCSD



RAY MODEL OF LIGHT

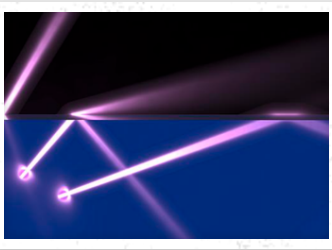
Fiber optics rely on total internal reflection for their operation. An optical fiber is a thin rod of high-quality glass. Lightray getting in at one end undergoes repeated total internal reflection and emerges at the other end.

DIFFRACTION

Students explore the wave phenomenon of light known as diffraction. It is a process by which a beam of light is spread out as a result of passing through a narrow aperture.

DIFFRACTION

With lasers and diffraction of a laser beam, students are measuring the thickness of a human hair strand:



RAY MODEL OF LIGHT

Students explore the refraction of light as it passes through a transparent medium. If the incident light ray makes an angle greater than a critical angle with normal of the surface, it undergoes a total internal refraction –- an amazing phenomenon the fiber optics technology is found upon.

Research & Mentorship:

Laura Vobrak, GSST Honors Research and Mentorship Coordinator and two senior students presented at the March 2022 New Horizons Board of Trustee Meeting. Senior students : **Mark Piatko**, Engineering Strand, 12th grade, Grafton High School, York County School Division and **Tori McLean**, Computational Sciences Strand, Hampton High School, Hampton City Public Schools presented their **Project:** Utilizing a Raspberry Pi attached to a drone with sensors to gather data about aerosols in the atmosphere.

SR. MENTORSHIP SPOTLIGHT

Student (Left): Seong Shin
Mentor (Middle): Dr. Nathanael Kidwell
Student (Right): Mark Piatko

GSST SHIRT SALES A SUCCESS

The 2021-2022 T shirt sales began in the last two weeks of Quarter 3 and we hope to distribute purchased shirts shortly after Spring Break.

Black shirt with White screen seen below in pictures

Deadline to order was Friday, April 1

Thanks to our T-Shirt Designers: Alexia Jennings, Kaitlynn Kinslow, & Hannah Bunting!

BACK OF SHIRT

FRONT "PATCH" ARTWORK

CONTINUOUS LEARNING

Note that GSST teachers provide asynchronous work for our students who are unable to either attend in person or to join a Zoom session, per our "Cohesive Plan for Continuous Learning".

GSST NAMED TOP SCHOOL BY VIRGINIA LIVING MAGAZINE!

Read more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2022