A. Linwood Holton Governor's School

www.hgs.k12.va.us
Virginia's First Virtual Governor's School

Spring 2012 Newsletter

Contents

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Director's News

While it seems a bit strange to imagine that this school year is almost completed, I am happy to report that 2011-2012 has been another successful one for HGS. During this school year we have had the privilege of serving 267 students from all across Southwestern Virginia. This brings the total number of students who have participated in our programs, over our 14 year history, to 3,286. As the following graph also illustrates, interest in our programs has grown steadily over the years.

Our teachers report that their students have worked very hard this year and many have distinguished themselves in a variety of ways – from classroom assignments, to projects, to international competitions. As we look to the future, we hope to continue to offer our most popular courses and perhaps add some in the area of Environmental Science.

We here at HGS would like to thank everyone who has worked behind the scenes to help us provide this opportunity to the students of our region. It is very gratifying for us to hear from our many graduates who have gone on to do well in higher education and/or launched very successful careers, literally all around the world.

Danny Dixon

A & P

EQUIPPED FOR THE FUTURE

It is Spring 2012 and much excitement is yet occurring in all Anatomy & Physiology classes. Most students have discovered how easy it is to recreate the actions of gastric juices in a Ziploc bag. Yes, right before their eyes, while at home in the kitchen, they are witnessing the breakdown of a chewed up piece of meat and many other edibles as it would occur in their stomachs. This has spread amazement as well as pleasure because many students found it necessary to complete the enjoyment of eating all of the strawberries in the bowl or several pieces of chocolate candy. This, by the way, was not part of the Laboratory assignment.

We had a fantastic experience at Eastern Virginia Medical School in early March. View **HERE** to see more photos of our students as they easily became physicians with their own live patients. They look so "medical" and "smart", which they are, in the pictures. It was great to see Spencer Leong, a former HGS Anatomy student from Abingdon High School who is a 1st year medical student at EVMS. He passed along some suggestions about Medical School applications and acceptance. He also told the students to do well in Mrs. Smith's Anatomy & Physiology class because it really is a help with college classes.


Karen Smith with Spencer Leong

The GAL or Gross Anatomy Lab at EVMS was everyone's favorite place. Students were rotated to several different tables with organs as well as cadavers. Each table was manned by a medical student or one of the doctors there. It was most impressive when Dr. Goodmurphy asked us to participate in a moment of silence and appreciation for the people who donated their bodies for the future of medical science education. We were amazed at the mission of EVMS, which is to provide medical services first to the community of Norfolk, Virginia. All students participate in community service at EVMS and are encouraged to keep doing it even after they receive their medical degrees.

Several students liked the Forensics Pathology Lab. Here we were able to look at diseased organs that were the probable cause of a death. Dr. Fantasky, an EVMS pathology instructor, related her experience working in a criminal forensics laboratory and performing autopsies. She had a captivated audience.

This school year has been one of the very best. It was good not to have the interruptions of snow delays and closings. It was also good to be able to teach all 11 body systems thoroughly. The students have done an exceptional job and most have worked very hard. Several days ago I asked, "If you were needed to assist in a medical procedure because of an emergency, do you think you feel equipped enough as a result of taking Anatomy & Physiology class this year to help and be involved?" It was a joy for me to hear, "Yes I can!"

Karen Smith

A

M

A

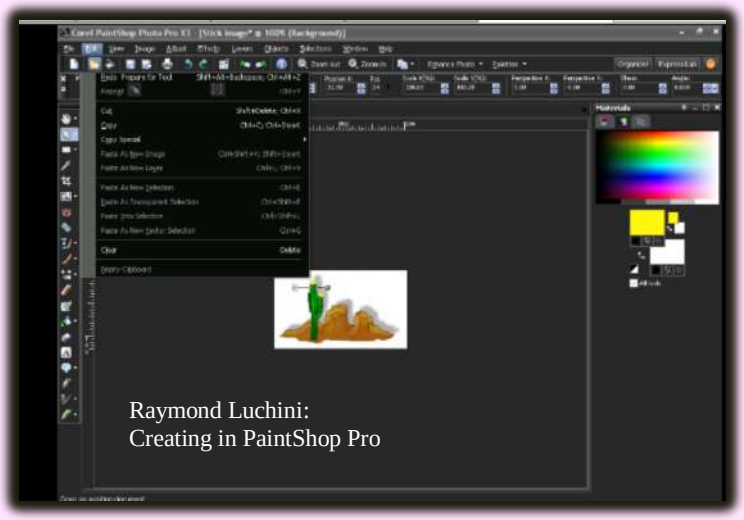
Multimedia — A Virtual Time Machine!

AMA—a class full of projects, research, and adventure! AMA started in 2009. We began with lots of ideas and workshops, and today, we have expanded to a multimedia class at its best. In this class, students work with fifteen different projects and many other in-class text book projects and assignments. Some projects include: Personality Portfolios, Image and Sound Project, Daily Routine, PSA, Interactive Presentation, Interviews, Music Video, Pivot, Movie Trailer, Video Scrapbook, Websites, and Multimedia Portfolio. Participants respond differently to the various projects. Dylan Statzer and Lauren Qualls from Rye Cove High School both enjoyed PSA (Public Service Announcement). Dylan's project depicted vandalisms, and Lauren exposed road rage and its demeaning characteristics. Both students enjoyed this project because they were allowed to involve other people in the project. Angela Reinhard from Gate City High School enjoys animation, so the Pivot fascination has been her pick of the semester thus far. For Kristopher Harris from Twin Valley High School, he has enjoyed the Daily Routine project. He says, "We were able to document what we do on a daily basis and kind of freeze it in time. It's a great way to look back and remember what our high school life was like when we're older."

For all AMA students, working with several projects and many software programs teaches students to become aware of the digital and virtual worlds around them. These are those moments that students realize all the work it takes to create the most perfect masterpiece. It is easy to go online and retrieve any image or sound file, but with copyright laws, we quickly learn in AMA what can and cannot be done. This class leaves students with a sense of accomplishment and pride that they can do all their own multimedia graphic design. With the website project, students create anywhere between six to twelve pages portraying their high school careers and upcoming college plans. Using SharePoint Designer, pages are manipulated to create layers and tables of self-created images and drawings. This project work begins early in the semester and becomes a favorite for the class.

When all is said and done in AMA, students are bringing projects from other classes into their workspaces to share with their peers. They are excited to share their new skills and ask for assistance in ways to improve their working projects to take them above and beyond their expectations. Here at Linwood, we expect more than the best—we expect perfection in our students' work.

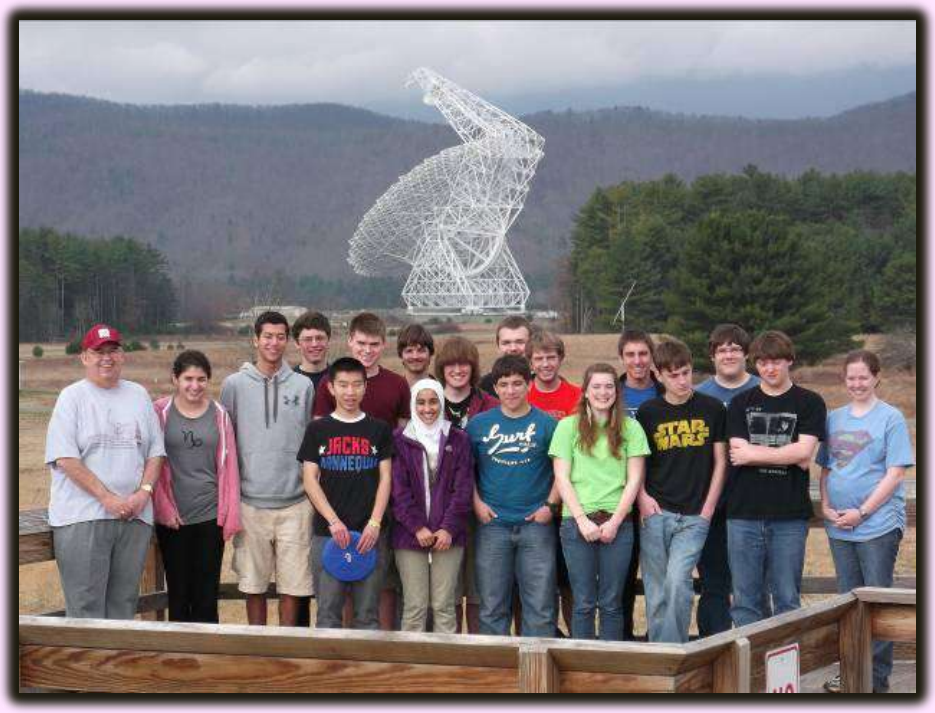
Melissa Wilson



Raymond Luchini:
Creating in PaintShop Pro

What a Field Trip! We Explored the Universe

Students from the Linwood Holton Governor School traveled with their instructor, Dr. Steve Rapp, to Green Bank, West Virginia, to explore the far reaches of the Milky Way Galaxy and some Mystery Objects during their weekend field trip. The students are in Dr. Rapp's Robotics, Astronomy, and Physics classes. Upon arrival the students were transported to the telescope for some fundamental instruction in using the radio telescope. Ensconced in an underground bunker on the grounds of the National Radio Astronomy Observatory (NRAO), these students commanded a 13-meter diameter radio telescope to conduct their own astronomical research.



Students at NRAO with The Green Bank Telescope in the background

They had two basic questions about the Milky Way Galaxy: They wanted to know if the Earth was located in one of the spiral arms of the galaxy and if the galaxy was rotating. Students gathered over 50 sets of data concerning the motion of Hydrogen in the Galaxy. Hydrogen emits radio waves at a frequency of 1420.41 MHz. By pointing the telescope at different Galactic longitudes and gathering data about the frequency shifts of the Hydrogen students discerned that the Milky Way is indeed rotating. If they detected a blue shift (when the frequency of the detected Hydrogen was above 1420.41 MHz) this meant that the Hydrogen gas was moving toward Earth. If a red shift was detected, this meant that the frequency of Hydrogen was less than 1420.41 MHz, and the gas was moving away from Earth. Students also detected clumps of Hydrogen atoms in the Milky Way at periodic intervals. This allowed them to deduce that the Milky Way Galaxy is indeed a spiral galaxy and that the Earth was located in one of spiral arms. Dr. Rapp's students were scientists for the weekend, collecting and analyzing data, and finding evidence to answer their questions about the universe!

Students collecting data in the underground radio telescope control room under the 40 foot telescope

Chart recording showing detection of hydrogen atoms in the spiral arms of the Milky Way (peaks on left)

Cosmic radio waves travel at the speed of light through interstellar space, and can be detected by the sensitive instruments at the Green Bank observatory and other observatories around the globe. Green Bank is unique, however, because it is in the middle of the National Radio Quiet Zone, and also home to the Robert C. Byrd Green Bank Telescope, or GBT. The GBT is the world's largest fully steerable radio telescope. Taller than the Statue of Liberty with a dish larger than a football field, the GBT also is the most massive moving structure on land and is used by scientists from around the world to study objects such as planets in our own solar system to quasars billions of light-years away.

"My students seemed to enjoy the camaraderie of the field trip and the opportunity to collect their own data and make their own conclusions based upon on the evidence just like research scientists do," said Dr. Rapp. The following student comment says it all: "The field trip to Green Bank really opened up my mind to a different part of science. The tour of the area and the vast information and history of the radio telescopes gave me a lot of knowledge about astronomy and how physics plays into it very smoothly. I learned about sound waves, frequency, and the universe we live in by just doing a few observations using the radio telescope. I really enjoyed using the technology and learning about the different kinds of complicated machinery that work in a radio telescope. Having no service on cell phones and using computer labs securely built with bolted doors also showed me how important it was to keep interference out of the way of the telescopes because of the changes it could cause in the data. This trip was definitely worth it and I'm glad I was able to understand radio frequencies by observing fresh data and recording it straight from the source."

Students gave presentations at the Green Bank Science Center on what they discovered in their research.

Videos of their talks can be found at the hyperlinks listed below:

Group 1: S. Emily Beauchamp, Tyler Cook, Richard Antoun
http://youtu.be/ZGHRbL1yh5M

Group 2: Rehan Razzaq, Phillip Head, Max Maurin, Corbett Hylton
http://youtu.be/t0tcfkODRQY

Group 3: Sana Sekkarie, Austin Patrick, Jose Piriz
http://youtu.be/A00AKvfjD9E

Group 4: Colston Polly, Dylan Statzer, Ryan Williams
http://youtu.be/kZAHOZJLNXI

Group 5: Jeffery Mullins, Tyler Jones, Otto Leung
http://youtu.be/nJJbYkJgg8o

Steve Rapp

Appalachian History Plans


Damaged houses in Scalp Level, near Windber, after the 1977 flood. Photo by Merle Agnello of the Tribune-Democrat.

The ALHGS Appalachian History Class launched a new program this semester. As a part of the various projects students complete in the course, students are encouraged to research topics that have a regional resonance. The inaugural theme is the Flood of 1977, which affected the entire region. At the time of this writing, three projects based on the flood are in progress. The goal is to create a long-term thematic project that can be added to by future students. "The fact that each student has one semester only in Appalachian History at the ALHGS limits the ability of individual students to cover the entire Flood," according to Mr. Hagy, the instructor. "This approach will allow collaborative work spanning academic years and including many students. Just as the Flood covered so much of the region, hopefully our ALHGS Appalachian History students may cover the history of the 1977 disaster from a regional perspective as interpreted by people born long after the event."

Pending the success of the Flood of 1977 thematic project, other topics will be added, according to Instructor Hagy. Possible topics include the local impact of World War I as the centennial of that war approaches.

Spring 2012 History Field Trip: Success!

The ALHGS Spring 2012 History Field Trip was March 29 to March 31. Roughly forty students and chaperones visited Bethabara and Old Salem in Winston-Salem, NC to trace the history of the Moravians and the settlements in the mid-18th century. The story of the Moravians meets several themes covered in all three ALHGS history classes: Western Civilization, World History, and Appalachian History.

The trip concluded with a visit to the Frontier Culture Museum in Staunton, VA. This unique site exposes students to sites brought over from England, Ireland and Germany along with key 18th century sites from the Great Valley of Virginia. The living history exhibits give students a good grasp of life both in colonial America but also in the connections between the Old and New Worlds. "We enjoy these sites not only for their beauty and style but also for the cross-pollination among all of the history courses taught at the ALHGS."

Based on student feedback, the trip was a success. Stephanie Taylor, Rye Cove High School, reported that "I am so glad that I went on the trip because I met some pretty amazing people and had fun as well. It was very educational, but at the same time I really enjoyed myself." Brandon Surber, Northwood High School, said "Each [site] contributed to the cultural melting pot we have, but I especially enjoyed the Irish settlement as I am Irish in heritage." Breanna Lester, Ervinton High School, observed "In Old Salem, it was nice to be able to walk down the street and go inside many of the old buildings with so much historic significance to them." Robert Jones, Northwood High School, noted "Old Salem was a marvelous, gorgeous environment to witness. I adored every minute of my time spent here, it's phenomenal to register in one's mind how well kept the unique town of Salem really is, and how it brings anyone back to the seemingly luxurious, and bustling town of Salem as it was seen through the eyes of a late 18th century civilian."

Plans for the 2013 ALHGS History Field Trip are underway, with plans to return to both Bethabara & Old Salem as well as the Frontier Culture Museum.

Brandon Surber, Northwood High School, said "Each [site] contributed to the cultural melting pot we have, but I especially enjoyed the Irish settlement as I am Irish in heritage."

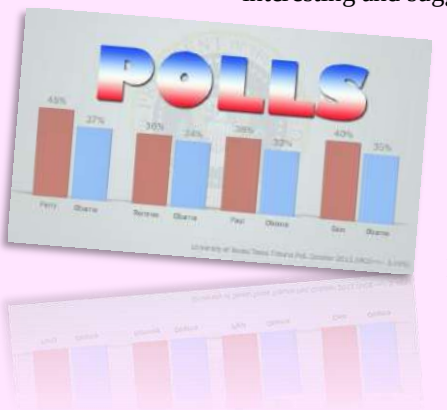
MEGA MILLIONS JACKPOT, GASTRIC BYPASS SURGERY, LIFE ON MARS, AND POLLS

What, you may very well ask, does Mega Millions, gastric bypass surgery, possible life on Mars, and opinion polls all have in common? The answer is a surprising simple one: **probability and statistics**.

A study, recently published in the *New England Journal of Medicine*, concluded after extensive statistical analysis that gastric bypass surgery offered significant benefit to people with type II diabetes. The analysis was able to show that the benefit went far beyond that of just the weight loss benefit. What has been characterized as surgery induced remission allowed some patients who were taking 500 mg doses of Metformin, what one may characterize as a diabetes control drug, to go to a 100 milligram dose and then to no diabetes control drug. The doctors were able to link the diabetes remission to the gastric bypass survey through their statistical analysis of the data.

…and who missed all the news about the recent Mega Millions jackpot "swelling" to over $640 million dollars through over $1.46 Billion - yes, that is Billion with a "B" - in ticket sales? Some individuals were buying $55 in tickets while a store clerk reported the sale of $2600 in Mega Millions tickets to one person in Arizona (which, by the way, did not increase their odds of winning in any meaningful way). In the end, multiple people won the big prize with the odds of anyone winning being about 1 in 176 million. How are such massive "games" managed? The answer is simple: knowing the mathematics of probability. Through an understanding of probability, game officials know the income to be realized by the states. With this knowledge, they can use daily ticket sales to predict the jackpot (the size of which can obviously increase ticket sales even more), and broadcast the odds of winning.

According to a recent article from Discovery News, mathematical analysis (*i.e.*, probability and statistics) was used to find close correlations between the 1976 Viking Mars Lander's experiment results complexity and those of terrestrial biological data sets. Researchers claim that the high degree of order found is more characteristic of biological, rather than purely physical processes. This suggests, the researchers claim, the lander found evidence of life on the surface of Mars. While much work remains to prove the effectiveness of the analysis performed, the results are nevertheless very interesting and suggest a non-traditional way of identifying biology.



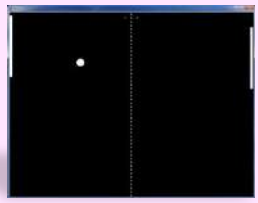
With the Presidential election time rapidly approaching, a common feature in the news is the poll showing which candidate would win were the election held on that day. Paying close attention to the polling details, one often sees that the poll results are frequently obtained through a survey of a little over 1000 people conducted overnight or over a three-day period. How do they do it and how do they do it with such great accuracy? Again, the answer is probability and statistics.

If you are planning a career in any medical field, see yourself working in the gaming industry, like biology or have an interest in exobiology, want to start your own polling company, or just want to be an informed person, then a background in probability and statistics is essential.

One way of getting this essential background is through the Governor's School *Probability and Statistics* class. During the course students look at questions about climate change, gas price volatility, medical issues, grocery shopping monthly trends, and many other topics through individual and group projects. Oh, and the answer is yes: you will have the analytical tools to open your own polling company after completing the course.

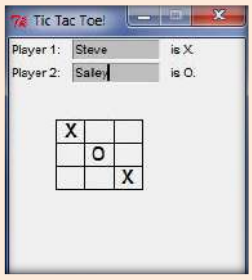
The Governor's School *Probability & Statistics* course, which provides students six hours of dual enrollment credit, is offered for academic year and block schedule students. Want to know more? You may contact the instructor, Dr. Bruce Norton, at any time with any questions you have about the class. He can be reached via email at bnorton@hgs.k12.va.us.

It's Big Game Season!



Lions and Tigers and Bears…Oh My. Oh No! It's not that type of "big game" season….it's big video game development season in the Governor's School ***Engineering Methods & Computer Programming*** class. As one of many varied projects throughout the term, students are writing code to amuse, entertain, and amaze through their creation of arcade style video games.

The classic game of Pong implemented using the Python programming language by an EM&CP class student.

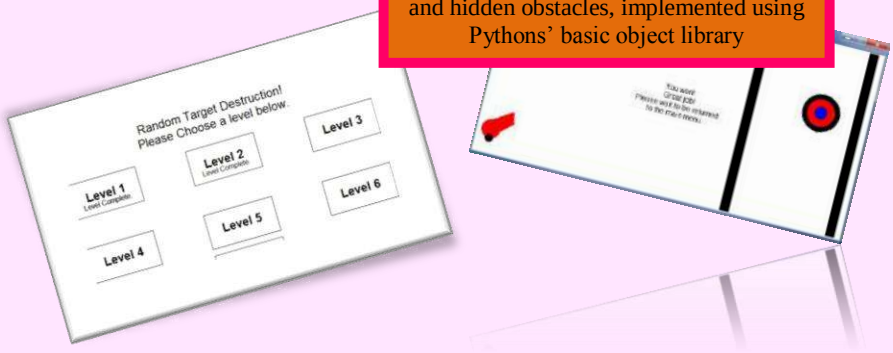


Earlier in the term, as part of learning to program, student's developed simple video games, several of which are shown within this article. However, creating video games has not been the only subject for the course.

A desktop "app" version of the classic Tic Tac Toe game using Python's TKinter graphics tool kit

Students have developed tools for validating input for web site forms, written routines for procedures used in desktop calculators, covered basic numerical modeling and analysis including convergence and stability, developed plotting and graphing routines, simulated sporting games such as tennis, racquetball, and volleyball, and much more.

A "single shooter" game, with pop-up and hidden obstacles, implemented using Pythons' basic object library



Before the term ends, students will be developing Microsoft Windows desktop applications with the look and feel of commercially available programs. Not only will EM&CP students be able to boast of significant programming skills, they will have the tools to take on and solve difficult problems far removed from the world of computer science. Engineering Method's and Computer programming is offered by the Governor's School for both academic year and block schedule students. Join the fun…sign up for the fall class today.

Bruce Norton

Student Reflections

RETHA HESS
2006 GRADUATE

Retha Hess entered A. Linwood Holton Governor's School as an anatomy student in the fall of 2004. Today, a few years later, she is enrolled in the Doctorate of Nursing Practice Program at East Tennessee State University.

Like most Linwood students, Retha's collegiate voyage began before she graduated high school in 2006. After graduation, she began classes for the nursing program at SWCC. She recalls her SWCC experience, "My journey at SWCC was very difficult transitioning from a high school student to a college student so quickly, but when all was said and done it was a very rewarding experience and achievement. My WOW moments in nursing happen every time someone simply says 'Thank You' for taking care of my loved one. It's not that I do miraculous things, but nurses are so appreciated by just their caring touch and attitude." She completed her Associate's Degree in nursing with a Health Science certificate in May 2008. By that fall, she began a Bachelor's of Science Degree in the Nursing program through King College and completed the degree in December 2009. It was here that Retha knew she wanted to pursue a higher degree. "I always knew I wanted to pursue a career in the medical field, but when I first started college I was unsure of how far I would pursue my education. After completing my BSN I decided to pursue a career as a Family Nurse Practitioner." She was then accepted to the ETSU Doctorate of Nursing program in Spring 2011 and began taking prerequisites that same summer. She began this program during the fall of 2011 and is currently in her second semester. Retha will complete her *Doctorate of Nursing Practice Degree as a Family Nurse Practitioner* in May 2014.

MEETING GOALS:

FAMILY NURSE PRACTITIONER

" . . . My WOW moments in nursing happen every time someone simply says 'Thank You' for taking care of my loved one. It's not that I do miraculous things, but nurses are so appreciated by just their caring touch and attitude."

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Thank You for your nurturing hand!

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Participating Schools

Abingdon High
Bland High
Carroll County High
Castlewood High
Central High
Chilhowie High
Clintwood High
Council High
Eastside High
Ervinton High
Galax City High
Gate City High

Graham High
Grayson County High
Grundy High
Haysi High
Holston High
Honaker High
Hurley High
J.I. Burton High
John Battle High
Lebanon High
Lee High
Marion Senior High

Northwood High
Patrick Henry High
Richlands High
Rocky Gap High
Rye Cove High
Tazewell High
Thomas Walker High
Twin Springs High
Twin Valley High
Union High
Virginia High

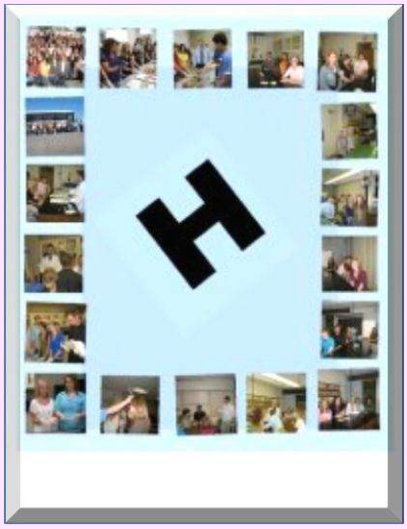
Participating Colleges

MOUNTAIN EMPIRE COMMUNITY COLLEGE
SOUTHWEST VIRGINIA COMMUNITY COLLEGE
VIRGINIA HIGHLANDS COMMUNITY COLLEGE
WYTHEVILLE COMMUNITY COLLEGE

OUR MISSION

Is to provide **challenging learning opportunities** for the gifted & talented students of far Southwest Virginia that are not available to them in their regular school program.

We will accomplish this by **strengthening their abilities** and **nurturing their social and emotional well-being**—through **mentoring, rigorous academic courses, service to the community, and leadership training** within an *entrepreneurial culture that encourages* ***creativity, initiative, and problem solving.***



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Find us on **to discover more about upcoming events!**

Want to see our field trip photos? Newspaper articles? Instructor videos?

What about keeping up with your class alumni?

Or, simply use it as another avenue to just "keep in touch." We would love to hear from you!

We're here and waiting…and remember… we are already one of *your* biggest fans!

Check us out!