



Linwood Holton Governor's School

**2016-2017
Mid-Year Newsletter**

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



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Director's News

Greetings to all of our students and supporters of the A. Linwood Holton Governor's School (ALHGS). I have been here for four months and have learned so much. I am inspired by our hardworking staff, appreciative of the staff at our partner schools, and I am in awe of the amazing students that choose to take our courses. In an effort to grow the course options for students, ALHGS has two new and exciting opportunities for courses beginning in the Fall of 2017 – **Dual Enrollment Biology** and **Dual Enrollment Introduction to Networking (Cybersecurity)**. Both of these classes are being offered based on the request of area school divisions in an effort to offer more opportunities for students in Southwest Virginia.

The other exciting new development is that we will offer asynchronous courses for the first time in the Fall of 2017. These class will maintain the same rigor and engagement as our synchronous (live) classes but in a more schedule friendly format. All of our asynchronous classes will have a component that is designed to build unity and community within the Governor's School. Each class will develop unique learning experiences for their students and at least once per semester have the students together participating in these engaging academic activities. The following are four of the potential asynchronous course offerings beginning next Fall:

- ❖ **Appalachian History**
- ❖ **Creative Writing**
- ❖ **Environmental Science**
- ❖ **Advanced Multimedia Applications**

I am excited for the future of the A. Linwood Holton Governor's School as we develop new opportunities for the great students we serve. If we can ever be of any assistance to you please let us know.

Mike Robinson



CREATIVE WRITING

WRITE IT.
•
PUBLISH IT.



For the second year, HGS Creative Writing students entered the Young Playwright's Festival sponsored by the Barter Theatre.

Performances of the winning plays were November 7 at 9 am, and 11 am, with a special showing on Stage II at 7 pm.

Why Current Students Recommend You Take the Course

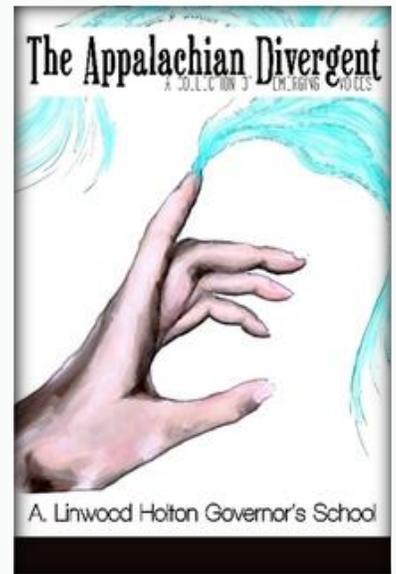
This creative writing class unexpectedly became my favorite course in high school very quickly. I never thought of myself as a writer but this class opened my potential and exposed me to new things that I would never have been able to access in my typical high school setting. - Cody Meade

It's been really fun, honestly. I just love not having to write your typical five paragraph essay with the thesis and conclusion. We write our own stuff, and it doesn't even feel like work. - Clay Turner

To be honest the reason I took this class is because one of my best friends would not leave me alone until I agreed to take it. I have really enjoyed this class, and I feel like I have learned so much about a more creative side of myself. This is my favorite class this semester because even though we do work, it doesn't feel like work. - Mackenza Harris

I deeply enjoy this course. The reason I really decided to take this class was because I've written two novel type stories and I was hoping that it would help me get better with my writing. This class has really been interesting and I love how it is set up. - Kettera Sergent

I really enjoy the Creative Writing class. I took it in hopes of becoming a better writer, and I know that my style has already improved. Mrs. D, along with my classmates, make the class fun and make writing, whether it's short stories or critiques, enjoyable. - Leanne Thomas



Issue 3

Get your hands on the newest issue today!

Contact Mrs. D at dlocke@hgs.k12.va.us for details.

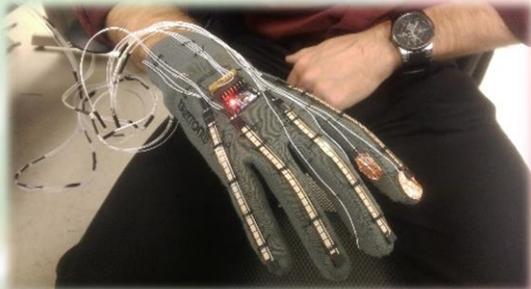
Think Computationally: The Road to Physical Computing

You walk into a large room. The floor looks like the surface of a local lake on a clear autumn day. With each step, what looks like the lake beneath your feet ripples as you walk on its “water surface.” You turn on your smart phone and move your fingers across the glass playing the classic game of pong. Next, your deaf friend, who knows you do not know her language, puts on a special pair of gloves. She starts “talking” to you using American Sign Language. As she signs you hear the words she is signing. Water starts flowing, with you in complete control. When you wave your hand to the right, the water stops flowing, waving to the left the flow begins again, and as you then wave your hand up, the flow volume decreases.



Pong on an Android Phone

These scenarios are all the work of major software and computer hardware vendors, right? Wrong! They are the work of students using the Processing or Python programming language, sometimes coupled with a simple over-the-counter interface or video game machine component from an Xbox system.



Sign Language translation glove (left) and home-made radar display (right), physical computing examples using the Processing and Python Programming Languages.

Processing and Python are both programming languages used by students in the Governor's School's Engineering Methods and Computer Programming (EM&CP) class as they learn to think computationally: how to solve and manage complexity through abstraction. Processing, a language developed at the MIT Media Lab, uses simple instructions to create complex visual expressions and interactions. One can use it to easily create an interactive image, such as the still frame shown here,

Image created using the Processing Programming Language



or a small keyboard instrument on your Android smartphone, or with a simple translation, an interactive application for a web page. And that is just the start.

Then there is Python: a simple to learn programming language that is now used for scientific analysis and modeling as well as interaction for the web....and used by companies and agencies from NASA to Google.

Fall semester EM&CP students are well on their way down the road and now starting to put their creative skills to work building interactive applications as well as traditional analysis projects.



But is there anything of benefit from learning to code long term? The simple answer is **YES!** Currently, it is estimated that over 60% of all STEM related jobs require that you have programming skills, and the percentage will rise as the calendar advances. What if you plan something other than a career in a STEM related field? Learning to program is learning to think computationally and developing problem solving skills that can be used in any field.

Want to start your walk down the road? Join us for the **Spring 2017** block session of **Engineering Methods and Computer Programming** with classes starting January 2016. The Governor's School course, which is EGR 125 and EGR 127 in the VCCS Course Catalog, offers students six hours dual enrollment credit at the completion of the course. The class is offered in both the academic year format and the block schedule format. The block schedule format is offered only during the spring semester. For additional information about the course, please check the HGS web site or contact the course instructor, Dr. Bruce Norton, through email via bnorton@hgs.k12.va.us.

EGR 125 – Introduction to Engineering Methods

Applies problem-solving techniques to engineering problems utilizing computer programming and algorithms in a higher level computer language such as FORTRAN, PASCAL, or C++.
(3 credits)

EGR 127 – Introduction to Computer Programming

Introduces programming in a higher level language such as FORTRAN, BASIC or PASCAL, or C++ on the microcomputer. Uses the operating system, packaged software and peripheral devices. Emphasizes engineering program problem solving.
(3 credits)

Pre-requisite requirement of Allegra II

The Supernova Hunters Project

Dr. Steve Rapp

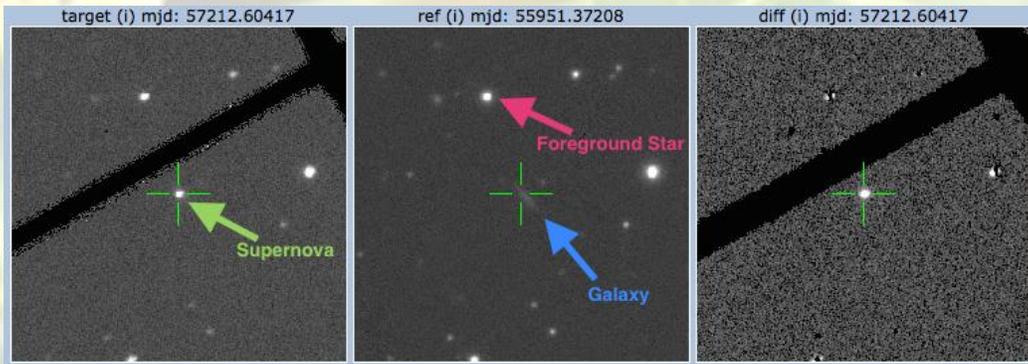
Supernova Hunters are active at Linwood Holton Governor's School. Students in Dr. Rapp's Physics class and Engineering class have teamed up looking for Supernova in images gathered from the Pan-STARRS1 Telescope in Hawaii. Pan-STARRS stand for the Panoramic Survey Telescope and Rapid Response System. The 1 refers to the fact that the current telescope is the first of 4 planned. The Pan-STARRS1 telescope is a prototype developed at the University of Hawaii's Institute for Astronomy. The design combines a relatively small mirror at 1.8m (the largest telescopes are currently about 10m) with a large digital camera with 1.4 gigapixels (GPC1). Students are looking for objects that suddenly appear rather than looking for objects that move.



The Crab Nebula (M1) (image above) is thought to be the remnant of a supernova reported in 1054AD by Chinese astronomers. The supernova was so bright that it could be seen from Earth by the naked eye. The nebula is the gas thrown out by the supernova. At the center of the nebula is a pulsar left behind by the supernova and which causes the gas to glow.

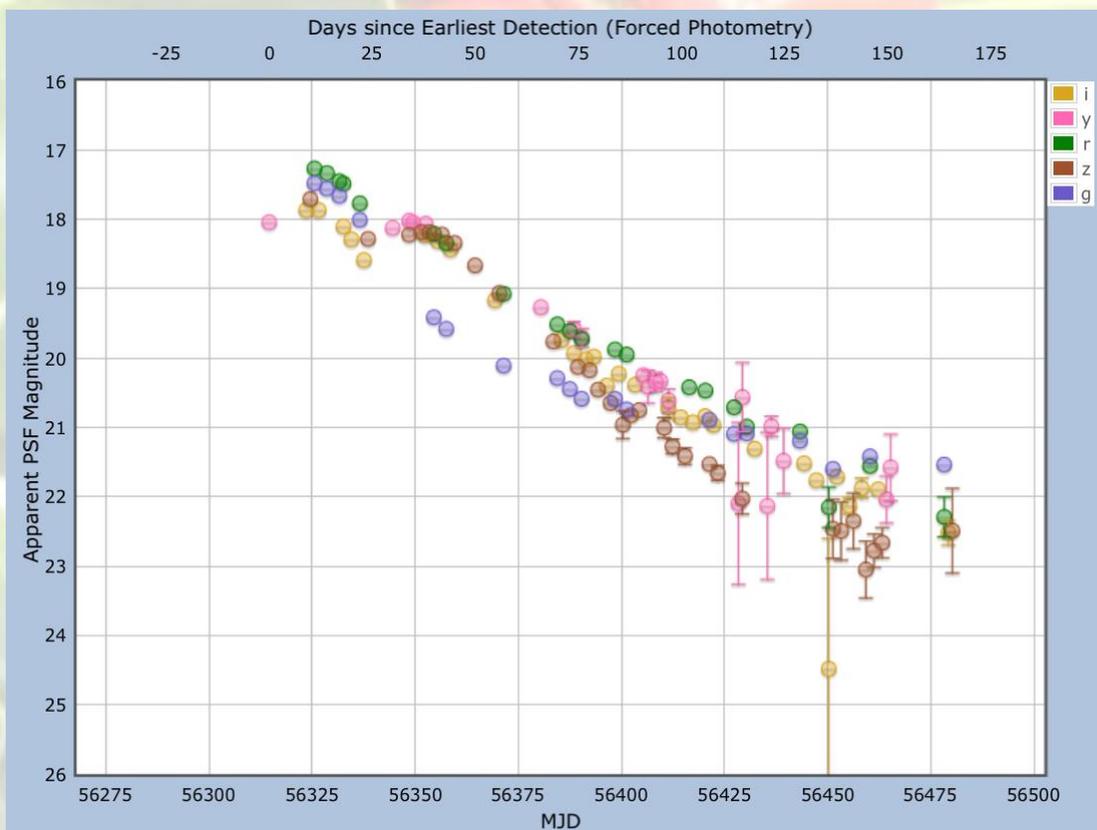
Supernovae are stars that explode with the energy of a few thousand atomic bombs. Astronomers want to understand which stars explode and why. These have implications for our understanding of how stars evolve and even explain how exotic objects like pulsars and black holes form. If a supernova doesn't match theoretical predictions, that makes it interesting. It suggests that we don't fully understand the underlying physics or maybe the explosion is caused by some other scenario that we haven't considered yet. These tend to be rare events and we have very little data that can help inform theory. The more common types of supernova are still important, we can use them to check that predictions of how often they should occur are correct and certain types can even be used to measure the expansion of the Universe.

Because of the large area of the sky covered by Pan-STARR1, students have lots of data to analyze. Supernovae are also extremely bright and can out-shine all the other billions of stars that make up their galaxy. This means that they can discover distant supernovae even if they don't see the galaxy hosting the supernova.



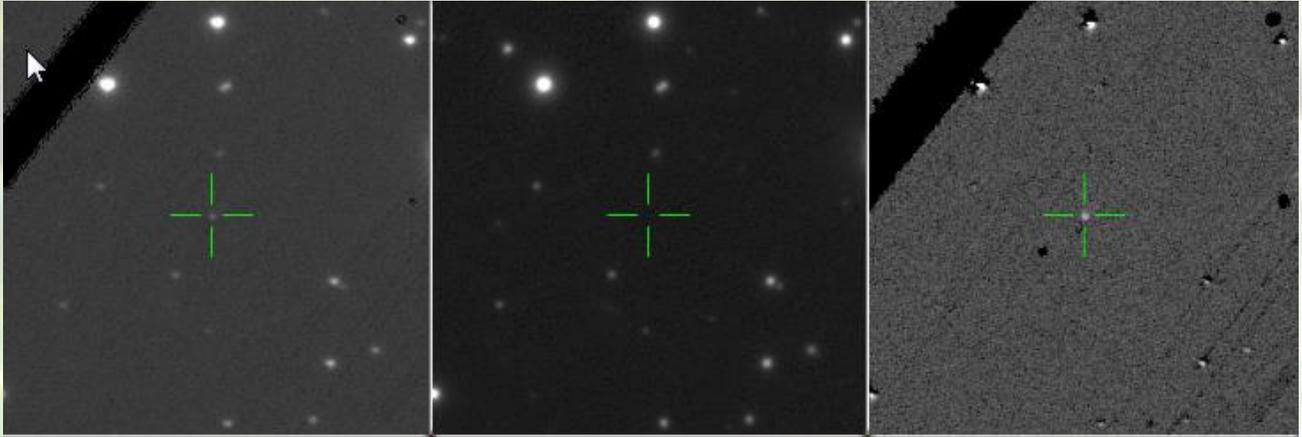
In this example a star in the galaxy visible in the center image explodes as a supernova. Despite the fact that this galaxy contains many billions of stars, the supernova in the left image is many times brighter.

Searching for supernovae in this way produces vast amounts of data each night that Astronomers must sift through to find supernovae. They have software that tries to attempt do this but it produces many bogus detections of supernovae that must be filtered out by humans. With a small team of researchers data may not get filtered for a few days by which time the supernova could have reached peak. This is where my students come in. They can help quicken the pace by analyzing the data sooner.

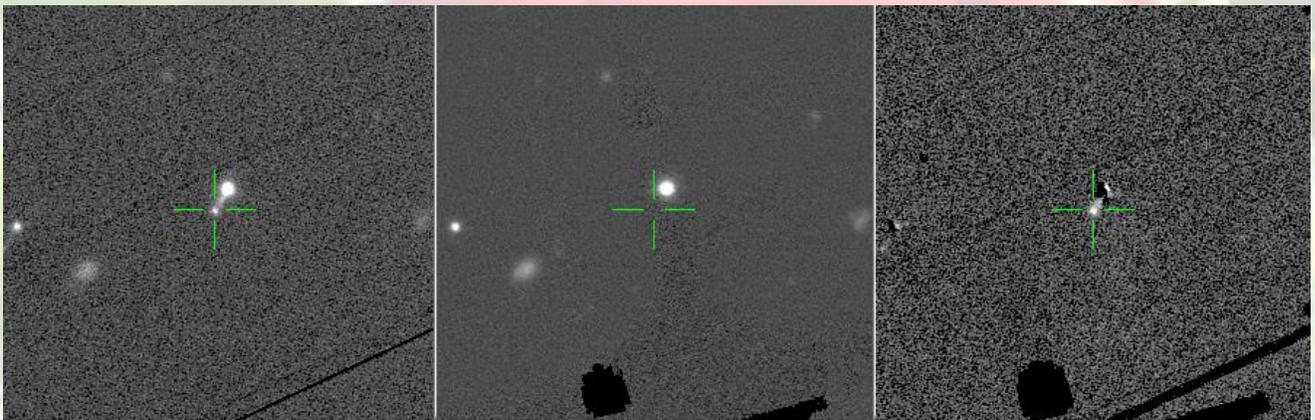


This plot shows how the brightness of a supernova changes over time. Each point shows a Pan-STARRS1 observation. The x-axis is in units of days (MJD is just how astronomers count days) and the y-axis shows how bright the supernova was on each day. In this case we can't be sure when the supernova exploded or how bright it managed to get before it was discovered.

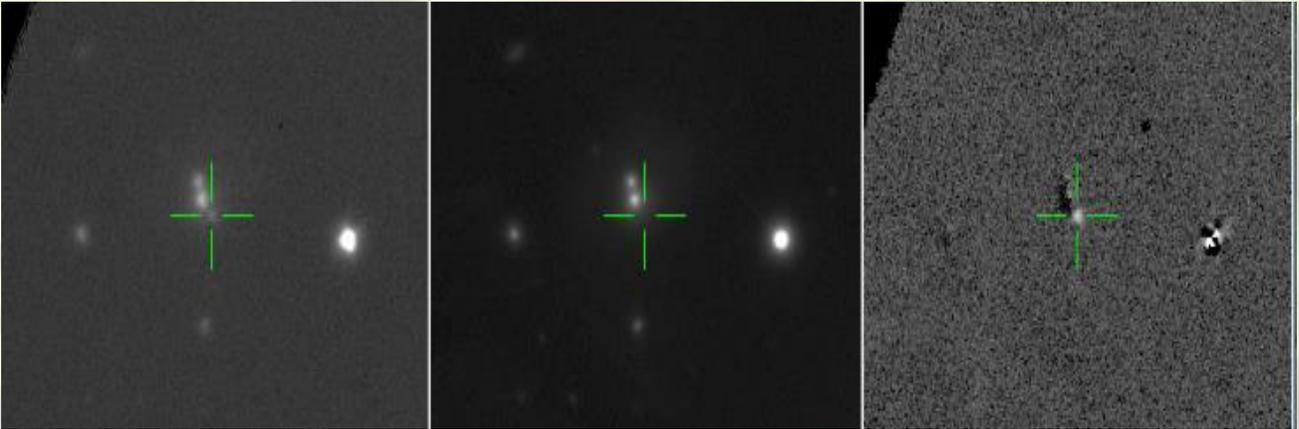
By helping the astronomers filter each night's data they can discover supernovae earlier. This allows them to alert other astronomers who can gather observations that cover the entire evolution of a supernova from explosion until it fades and disappears. Students may also reduce the number of bogus detections that rely on human filtering. Students are trying to discover supernovae which appear as new sources of light. We hope to identify supernovae by comparing images of the sky taken a few years ago with new images taken a few nights ago. If there is a detection in the left image that looks like a star (looks like a dot) and it also appears in the rightmost image but does not appear in the center image then it is likely a *real* detection of a supernova. Below are some of the images that Dr. Rapp's students have analyzed.



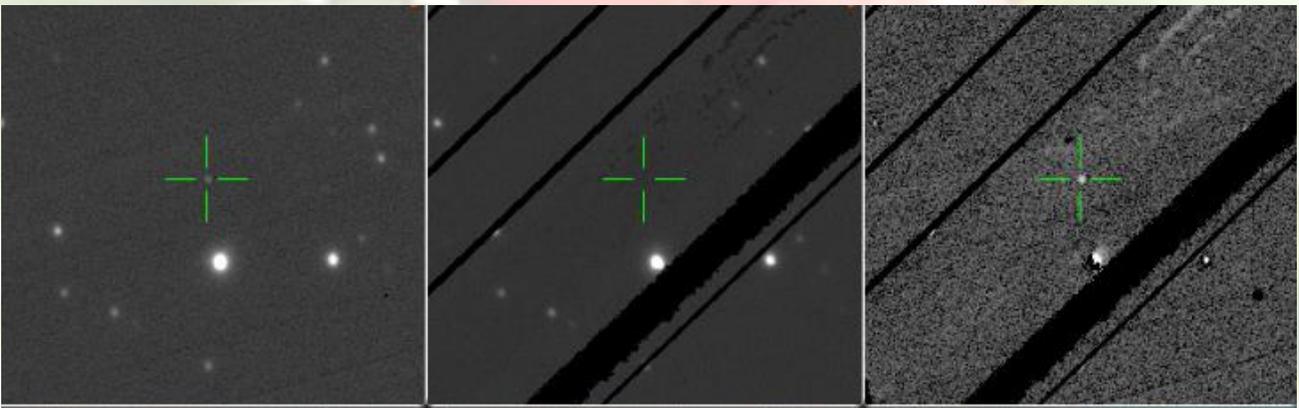
Blair is almost certain that she has discovered a new supernova. The left image has a dot in the crosshairs, the middle seems to be empty, and the right image seems to have a brighter dot in the crosshairs. This seems to meet the criteria for a new supernova!



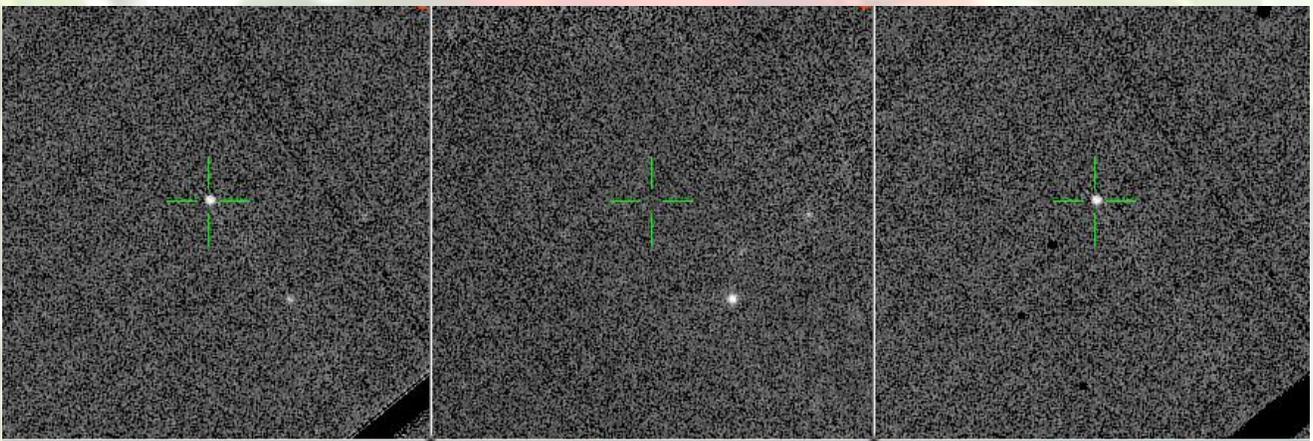
This image that Blair analyzed does not contain a new supernova since the center photo has a bright dot (star) near the crosshairs.



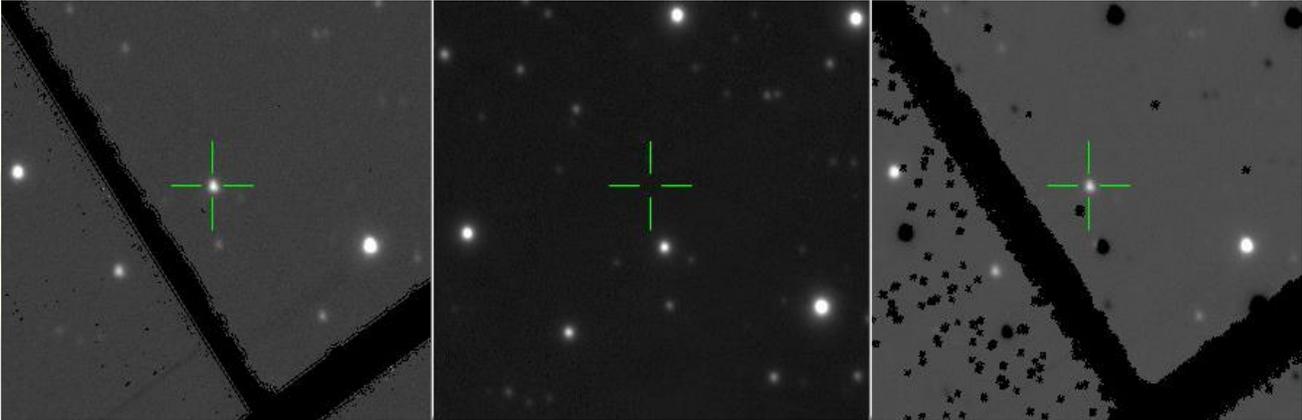
Walker marked this image as containing a potential supernova. The left image shows what appears to be an artifact and the center image also shows the artifact. I guess we will have to wait to see what the astronomers say.



This image, also checked by Walker, seems to be a potential supernova. It appears to fit all the criteria for a new supernova.



Zachery discovered this potential supernova. Blair agreed with him.



This group of images, also analyzed by Zachary and considered by him to be a new supernova, seemed to follow the criteria perfectly.

Above are just a few samples of the 2700 images that they have observed so far. My students and I believe that they have discovered at least 100 new supernova. Only time will tell. We will be waiting to hear from the astronomy team. "I am extremely proud of my students," said Dr. Rapp, "They have put a lot of time and effort into this project."

MEC 101 - Introduction to Engineering Technology I

Introduces engineering technology. Provides historical background. Covers such topics as professional ethics; problem solving techniques involving forces, structures, materials, fluids, energy, and electricity and U.S. Customary and S.I. units, and unit conversions. 2 credits

IND 160 - Introduction to Robotics

Studies evolution and history of robotics with an emphasis on automated and flexible manufacturing. Presents advantages and limitations of present robot systems. 3 credits

PHY 121 - Principles of Physics I

Covers fundamental principles of physics. Includes mechanics, thermodynamics, wave phenomena, electricity and magnetism, and selected topics from modern physics. Prerequisites 2 units of high school algebra and one unit of high school geometry or equivalent. Part I of II. 4 credits

PHY 122 - Principles of Physics II

Covers fundamental principles of physics. Includes mechanics, thermodynamics, wave phenomena, electricity and magnetism, and selected topics from modern physics. Prerequisites 2 units of high school algebra and one unit of high school geometry or equivalent. Part II of II. 4 credits

This semester's Environmental Science students have been very enthusiastic about the hot topics of the course, which include **species conservation**, **water quality** and **supply issues**, **renewable energy**, **environmental health**, and **air/water/soil pollution** issues. Several of our students plan to pursue college degrees and careers in the Life Sciences, and we have enjoyed discussing how environmental science is woven into other science fields as a true interdisciplinary science. We are using a new textbook this semester which is exciting because it contains updated relevant information. In addition, the new textbook includes supplementary online resources to help illustrate course topics and helps students improve their study skills. We have discussed several current and ongoing issues, like the Dakota Access Pipeline and the water quality issues in Flint, Michigan. Students are learning how to find reliable, peer-reviewed scientific articles amidst the sea of information available on the internet, and then process that information into writing that is clear and easy to read. Their problem solving and writing skills are improving as the semester advances.

For the 2017-2018 school year, Environmental Science will be offered as an asynchronous course in hopes that more students will have the opportunity to enroll. Past and current students want to encourage all potential Holton Governor's School Students to take this course. They feel that the course has taught them how to live more sustainably and save money with wise economic/environmental decisions. Students also mention improved confidence in test-taking and study skills after taking this course. For more information about Environmental Science, contact Mrs. Julie Reimer at jreimer@hgs.k12.va.us.



ENV 100 – Basic Environmental Science

Presents and discusses basic scientific, health-related, ethical, economic, social and political aspects of environmental activities, policies/decisions. Emphasizes the multidisciplinary nature of environmental problems and their potential solutions. (3 credits)

ENV 220 - Environmental Problems

Studies the relationship of man to his environment; ecological principles, population dynamics, topics of current importance including air, water, and noise pollution; poisoning and toxicity, radiation, conservation and management of natural resources. (3 credits)

Pre-requisite requirement of Biology

As winter approaches, students in the ALHGS Fall Block Appalachian History class conclude work on their semester research assignments. Just as winter hibernation begins, the work of these Appalachian History students show our local history is vibrant year round.

“There is a fine crop of Course Projects and Mysteries in Appalachia assignments this semester, based on the students work to this point,” says ALHGS History Instructor Mark Hagy. “With a range of topics from a paper on the history of Bland County to an exploration of famous mysteries such as the disappearance of Wallace Thrasher, these young people are fleshing out the history of our region in a variety of areas and ways.”



Mr. Hagy asked the students to respond to basically four points about their projects:

- Why they selected their topics?
- What have they learned at this point?
- Why they think this topic is important?
- What they hope to learn from their research?

Their answers to these questions, and their thoughts about their work, form the basis of this article,” Hagy recounts.



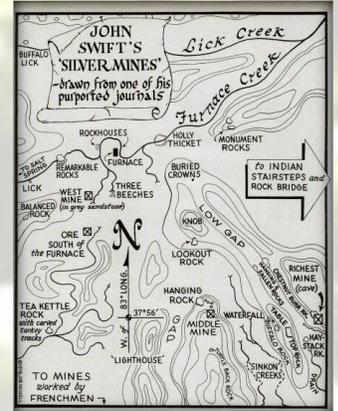
Tanner Wagner, a student at Twin Valley High, selected elk poaching for his Mysteries in Appalachia topic. Tanner writes, “I chose this topic because I find it very fascinating that people are willing to put their freedom on the line just to kill this magnificent animal. I have learned so far that in my county, Buchanan County, that there has been a problem with poaching the newly introduced elk before. I think this topic is important because elk once thrived in this region long ago, but got killed out. However, they are now reintroducing them into the wild in some

parts of this region, including Buchanan County. I hope to learn how the elk are handling being reintroduced into the wild here, and how those who poach them are being punished. I also hope to learn of other elk poaching encounters that may have occurred throughout this region.” Mr. Hagy comments: “Tanner’s topic is one of the most unique student selections we have had yet. I am learning quite a bit from Tanner’s efforts.”

Another Twin Valley High student, Gavin Counts, chose to pursue one of the persistent colonial-era legends of the region for his Mysteries in Appalachia assignment. “I chose this topic because I have heard a lot about it before, and I wanted to learn more about it. So far I have learned that

there is a rumored Silver Mine in a sharp bend of a river. This topic is important because it could lead to wealth in this area. I hope to learn more about Swift and possibilities of where the mine could be,” writes Gavin. “I was a little concerned at first that Gavin would be just another frustrated explorer,” Hagy observes, “but I am pleased that thus far he has been more scholar than treasure seeker.”

Alex Stiltner, also from Twin Valley High, decided to pursue a darker page of recent Buchanan County history: the 2011 shooting of four police officers. “I am researching the shootings of four police officers in Buchanan County for my Crimes of Appalachia project,” Stiltner writes, “I chose this project because it affected my community. The shootings of these four officers made many people fearful and our cops much more cautious and, subsequently, less friendly.” Hagy asserts: “This is a timely topic that, unfortunately, resonates across our nation. Alex is doing a fine job researching this, bringing the Appalachian region to the national discussion.”



Across Buchanan County, Caleb Street at Council High School is studying the Roger Keith Coleman case. Street reports: “Despite his claims of innocence, he was given the death penalty because of the evidence that was stacked up against him. However, many people believe that he did not do the crime and that he was given the death penalty for nothing. This case has raised many questions about whether or not the death penalty should be allowed as an acceptable form of punishment. I think this topic is important because it raises the question of whether or not the death penalty is an acceptable form of punishment.” “When Caleb selected this topic, I was glad to see a project on this case look at it more from the aftermath of the execution than delve into the actual trial. I think Caleb’s effort will raise valuable points,” observes Mr. Hagy.



Hagy is very optimistic about these projects. “At this time, it looks as if we will have some very good projects to add to the body of knowledge being collected by ALHGS Appalachian history students. I look forward to this!” As do many supporters of the ALHGS.

Appalachian History - HIS 205

This course addresses the history of the Appalachian region (from Pre-Columbian period through the early 21st century) with a focus on southern Appalachia. Emphasis will be placed on such skills as historical research, use of primary documents, oral history, archival work, and preservation. (3 credits)

a·nat·o·my

ə' nadəmē/

noun

noun: **anatomy**; noun: **anat.**

the branch of science concerned with the bodily structure of humans, animals, and other living organisms, especially as revealed by dissection and the separation of parts.

the bodily structure of an organism.

phys·i·ol·o·gy

fizē' ələjē/

noun

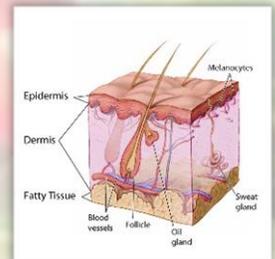
physiology

the branch of biology that deals with the normal functions of living organisms and their parts.

the way in which a living organism or bodily part functions.

a&p students are off to a great start as they acclimate to the demands of a college level science class. They are learning 700 Greek and Latin terms, the names of 206 bones, and the names of many muscles in the human body. Already students are realizing what they have learned has made them more aware of the health of family members and friends. They also are beginning to understand how some of the latest medical research is changing the medical field.

Earlier the Anatomy Classes finished the study of the Integumentary System. Our skin is the largest and heaviest organ in the body. The physiology of the integument is very interesting and understanding its chemical role in obtaining vitamin D from the sun to release the calcium in the food we eat and make it available for healthy bones, muscle contraction, and nerve impulse conduction is phenomenal. These students are going to be amazed many more times during this course.



Linwood Holton Governor's School offers a unique opportunity to students in Southwest Virginia. Here students from many different high schools come together and share their goals, their plans, and their lives. This is a community of students like no other. Students from past years have praised the classes as life altering. Every year the alumni of Anatomy Classes have reported their gratitude for the college preparation this class has offered.

As the 18th year of this educational program begins, Southwest Virginia has already seen the impact the students of the Governor's School have made in our area. This Anatomy & Physiology Class is preparing the future medical professionals and scientists of Southwest Virginia. What a future for all of us!

Karen Smith

BIO 141/142 - Human Anatomy and Physiology I and II

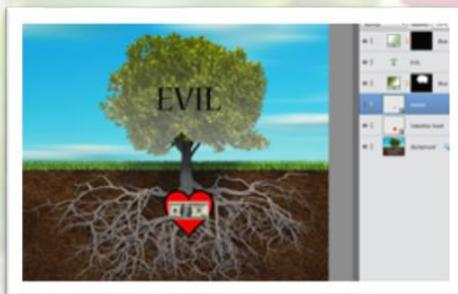
Integrates anatomy and physiology of cells, tissues, organs, and systems of the human body. Integrates concepts of chemistry, physics, and pathology. (4 / 4 credits)

Advanced Multimedia Applications By Course Instructor, Alicia Johnson

Advanced Multimedia applications is a course that tackles the various ways that we can communicate our thoughts, messages, and ideas to an audience using digital media. An “audience” can be our peers, our employers, our instructors or loved ones. This 2-part course instructs students on the use of hardware and software tools used to create and edit media. Students study and use these skills to create multimedia messages throughout the six units on Text, Images, Animation, Audio, Video and Collaboration.

Students recently completed their “Images” unit where they were introduced to Adobe Photoshop. Photoshop uses the concept of “layers” where students can separate a creation into multiple layers and work on each layer and then combine the layers to create a single image. Their first experience with working in layers and utilizing peer feedback was to complete an assignment of creating a visual metaphor.

We use metaphors in written communication to enhance understanding and help to create meaning for our readers. This assignment had the same goals only through visual media instead. Following are what the students created (you’ll notice the Photoshop layers they created to the right of the complete image):



“Money is the Root of Evil”
Erin Taylor - Honaker HS

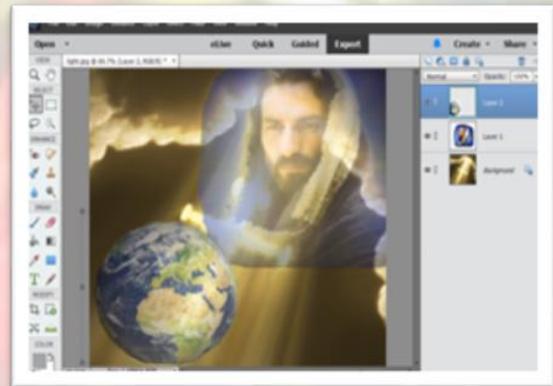


“Books are
the Seeds of
Knowledge”

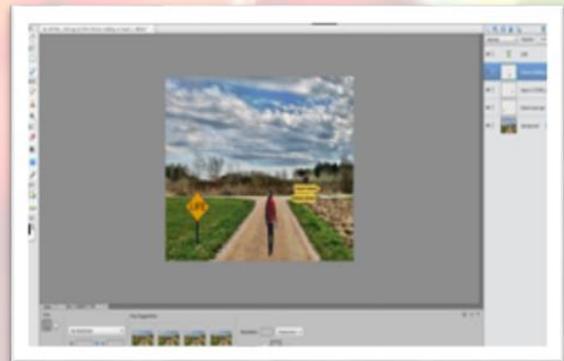
Isaac Mullins -
Ridgeview HS



“You’re the Apple of My Eye”
Jessica Caldwell - Central HS



“Jesus is the Light of the World”
Mackenza Jade Harris - Council HS



“Life is a Road”
Caleb Street - Council HS

Students also discuss the topic of ethics and image editing in an online environment.

We continue onto audio, animation, video units, and conclude with collaboration where learners create their own multimedia presentation in the form of a Public Service Announcement that incorporates many of their newly acquired skills. It is always a wonderful experience for me to see the thoughtful creativity of our students!

Probability and Statistics

For **Probability & Statistics** block schedule students, it has been a semester of a diverse range of application topics: risk of a coastal area being impacted by a tropical storm, genetics – the frequencies of alleles in a diploid population and how they can change over time, making predictions using employment data – salary relationship to age and education, and opinions of professions – likelihood opinions are related to the profession.

Projects: Now it is “project season”. Students are formulating projects to seek answers to questions in subjects of interest to them. Previous projects have included investigations into variation of gas prices in Southwest Virginia during big events, survey of sports data to determine if there is a relationship between team salaries and win percentages, grocery sales variation over a month, and from month-to-month, relationship between student grades and hours worked outside of school, and climate change through determination of average temperature variation in the western half of Virginia over a 60-year period.

Results: Check back in with the Spring 2017 edition of the Governor’s School Newsletter for the results of the project investigations now underway and the answers Probability & Statistics students found.



Want to learn how to find answers to your questions, as well as advance your academic career? Join the ALHGS *Probability and Statistics* Team. This Governor’s School’s course, which is MTH 241 and MTH 242 in the VCCS Course Catalog, offers students six hours of dual enrollment credit. The class is offered in both the academic year format and the block schedule format. The block schedule format class is only

offered in the fall semester. For additional information about the course, please check the HGS web site or contact the course instructor, Dr. Bruce Norton, through email via bnorton@hgs.k12.va.us.

Probability & Statistics - MTH 241

Covers descriptive statistics, elementary probability, probability distributions, estimation, and hypothesis testing. (3 credits)

Probability & Statistics - MTH 242

Continues the study of estimation and hypothesis testing with emphasis on correlation and regression, analysis of variance, chi-square tests, and non-parametric methods. (3 credits)

Governing Board Members

- Mr. Scotty Owens Buchanan County
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- Ms. Carol Caruso Norton City
- None Appointed* Dickenson County
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- Mr. Alex Zachwieja Russell County
- Ms. Linda Gillenwater Scott County
- Dr. Paul Grinstead Smyth County
- Ms. Donna Whittington Tazewell County
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- Dr. Jeff Perry Superintendent’s Representative

To Our Supporters:



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- Ms. Melissa Cook Guidance Counselor, Norton City
- Ms. Ruby Rogers Administrator, Scott County
- Dr. Jeff Noe Administrator, Washington County
- Ms. Pat Farmer Guidance Counselor, Washington County
- Ms. Debra Gilly Governor’s School Facilitator, Wise County

Participating Schools

- Abingdon High
- Bland County High
- Carroll County High
- Castlewood High
- Central High
- Chilhowie High
- Council High
- Eastside High
- Fort Chiswell High
- Galax City High
- Gate City High

- George Wythe High
- Graham High
- Grayson County High
- Grundy High
- Highland 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
- Ridgeview High
- Rural Retreat High
- Rye Cove High
- Tazewell High
- Thomas Walker High
- Twin Springs High
- Twin Valley High
- Union High
- Virginia High

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

Participating Colleges

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.*

Guide books, detailing requirements, Governor's School policy, etc., are available for both parents and students. These documents, along with a Code of Conduct for all Governor's School students, are available on the Support for Parents and Students web page located at:

http://www.hgs.k12.va.us/General_Supp.htm

