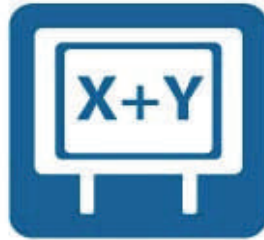
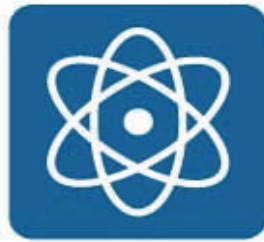


# 2012 STEM Festival



**Science**  
**Technology**  
**Engineering**  
**Math**





**STEM  
@HCC**



Dear Visitors,

Welcome to the first Hagerstown Community College STEM Festival. We hope you enjoy your day exploring the new state-of-the-art STEM (Science, Technology, Engineering, and Mathematics) Building and learning about the many unique features of this modern teaching and learning facility. The five-story, 65,000 sq. ft. STEM Building opened for students, faculty, and staff on January 9, 2012. We are very proud to showcase this beautiful building at the first public open house during this STEM Festival.

The mission of the HCC STEM Festival is to invigorate youth interest in science, technology, engineering, and mathematics by hosting a public gathering that features compelling, exciting, educational, and entertaining science activities for visitors of all ages. This festival will highlight local career opportunities in STEM, and it will inspire the next generation and scientists and engineers in our region. HCC has partnered with local K-12 school districts, four-year colleges and universities, industry and business partners, community groups, non-profit groups, and government agencies to help make this a successful event. Thank you to all who have contributed their ideas, input, and time toward the planning and implementation of this event. Our hope is that this will be the first of many family-friendly events offered by the college that will help promote STEM education in our community.

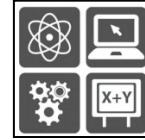
Enjoy the festival,

The Hagerstown Community College  
STEM Festival Planning Committee

*Cynthia Dove, PhD*  
*Judith Peisen, PhD*  
*Mylynh Nguyen*



# Festival Program



Sat., April 28  
10 a.m. – 2 p.m.

## Location: Outdoor Tent

### Man vs. the Motion Sensor

Western Heights Middle School

Grades 3—College

Attempt to match the speed versus time graph using a motion sensor. Participants will have an opportunity to walk, run, or stand still to have their graph match the computer's graph.

### Fun with Non-Newtonian Fluids

Western Heights Middle School

Grades Pre-K—8

Is it a solid? Is it a liquid? What is that stuff? Participants will examine the properties of several non-Newtonian fluids in this hands-on exhibit. Learn how to recreate these fluids at home using everyday household items.

### High School STEM

#### Magnet Program

Williamsport High School

Grades 9—12

Learn about Williamsport High School's engineering week, and find out about the special activities students are involved in at the Washington County Public Schools STEM Magnet program.

### STEM is Fun!

Smithsburg Middle School

Grades 6—8

Visit this table to find out more about

what students in Smithsburg are learning in the fields of science, technology, engineering, and mathematics. Each area of STEM will be highlighted with beautiful posters. Learn about string telephones, ooblek, twister tubes, gases, density, static electricity, crystals, and more.

### STEM in the U.S. Air Force

United States Air Force

Grades 9—College

Find out how the U.S. Air Force incorporates STEM in everyday life. Learn about opportunities where how you can utilize your STEM skills to serve your country. The Air Force can also offer assistance with paying for college. Serve your country while you attend college to pursue a career in STEM.

### Shaping Another Future

Volvo Group

Grades 3—College

The Volvo Group is one of the world's leading providers of commercial transport solutions. Volvo provides products such as trucks, buses, construction equipment, engines, and drive systems for boats and other industrial applications. Since 1961, the Hagerstown powertrain facility has been home to the development and manufacturing of heavy-duty

## Location: Outdoor Tent

powertrains. Hagerstown's world-class engine development lab made possible the innovation, research, and development of their current 2010 engines described as "the cleanest heavy-duty diesel engines in the world."

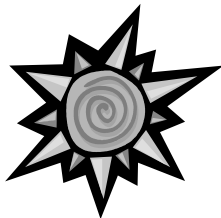
### **Blacksmithing with Low-Tech STEM**

Mr. Jack Appleby  
Grades 3—College

The STEM field of chemistry is the foundation of blacksmithing, the process of forging a metal until it becomes malleable. Blacksmiths produce many metallic objects. The chemical and physical properties of the elements used determine how well they work during blacksmithing. This is low-tech STEM: just a propane heater, a piece of cold-rolled steel, and some tools like a hammer, anvil, and chisel. This is real chemistry you can see with your own eyes done by an experienced blacksmith.

### **Sunspots, Flares, and Prominences!**

Tri-State Astronomers  
Grades 5—College



Learn more about the sun as you visit this fascinating exhibit. Identify sunspots, flares, and prominences with the help of Tri-State Astronomers! Learn about the mission of the group and receive information about the annual "Star Party" at Antietam National Battlefield.

Learn more about the sun as you visit this fascinating exhibit. Identify sunspots, flares, and prominences

### **Fun with Static!**

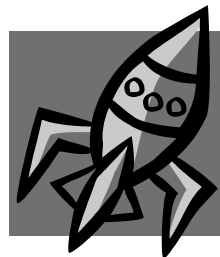
Martinsburg High Science National Honor Society  
Grades Pre-K—8

Participants at this exhibit will be able to take part in a hands-on demonstration using a Vandergraaf generator. Don't miss this hair-raising demonstration. The principles of physics behind the phenomenon will be explained.

### **The Chemistry of Rockets!**

Martinsburg High Science Club  
Grades 3—8

See rockets soar into the sky! Participants will make paper rockets and attach them to film cans with vinegar. The lids of the cans will be filled with baking soda. When the two pieces are attached together, the paper rocket will fly 10 to 15 feet into the air! Students from MHS will explain the chemistry involved.



### **Find Your Inner Green Thumb!**

HCC Alumni Association  
Pre-K—College

Visit this exhibit located in the outdoor tent to channel your inner gardener. Visitors will have an opportunity to learn about horticulture and ask questions to representatives involved in organizing HCC's annual Flower and Garden Show. Plant marigolds for the family.

## Location: Outdoor Tent

### **Egg Drop Challenge – Building Station**

HCC Physics Program

Grades 6—College

Calling all future engineers! You are challenged to build a device that will keep a raw chicken egg intact when dropped from the 2nd floor balcony of the STEM Building. Visit the tent and locate the “building station” equipped with all the supplies you need to create your egg protector. This is your chance to be creative and think like an engineer! All ages are welcome to participate. Egg drops will take place inside of the building. The viewing area will be at the 1st floor lounge. Heads up!

### **STEM Building Scavenger Hunt Station**

HCC Math Club

Grades 3—College



Visit this table to find out more about a fun-filled scavenger hunt that you can take part in to test your math skills while learning

more about the fascinating new STEM Building.

### **Layers of the Atmosphere Bracelet**

Daisy Girl Scout Troop #40067

Grades Pre-K—8

The Daisy Girl Scouts will help visitors make a bracelet to represent the layers of the Earth’s atmosphere. A coloring activity will be available to illustrate some of the properties of each layer and how they are studied (wind, aurora, photosynthesis, clouds, and weather maps).

### **Anti-Gravity Fun with the Atmosphere**

HCC Science Club

Grades Pre-K—8

A *Dora the Explorer* moon bounce will be set up to help children experience the fun of anti-gravity. Air from the Earth’s troposphere is compressed to fill the moon bounce’s base. This air pressure pushes back on little feet making jumpers defy gravity and fly up until gravity pulls them back down. Don’t miss the fun!

The **STEM Festival Welcome Table** will also be located inside the tent.

## Location: STEM Building 1st Floor

### **Adobe Illustrator Computer Demonstrations**

HCC Graphic Design

Technology Program

STEM-101 • Grades 6—College

Work with HCC students to learn about Adobe Illustrator during a hands-on demonstration. Participants will

work in one of the STEM Building’s brand new computer labs. Create a radial symmetry and logo and examine student portfolios.



## Location: STEM Building 1st Floor

### Interactive Computer Gaming Demonstrations

HCC Simulation & Digital Entertainment Program  
*STEM-102 • Grades Pre-K—College*

Let's play some computer games! A range of computer games and interactive programs will allow participants enjoy science and technology. Participate in a quiz game with planets, animals, or learn more about the USDA Food Pyramid in an interactive way.

### Fingerprints, Biometrics, and Computers!

HCC Cybersecurity Program  
*STEM-109 • Grades Pre-K—8*



Learn how to program your computer to recognize your fingerprint instead of a password. Make your files safe from hackers with this hands-on application using measurements of your fingerprints (biometrics) to increase cybersecurity of your computer.

### Earth Day Themed Poster Display

HCC Graphic Design Technology Program  
*1st Floor Lounge • Grades 3—College*

Graphic design students at HCC are excited to showcase their latest projects with festival visitors. Please stop by the 1st floor lounge of the STEM Building to see a gallery of Earth Day themed posters designed by HCC students. National Earth Day is celebrated annually on April 22. This display will increase your awareness and appreciation for the Earth's natural environment.

### Egg Drop Viewing Area

HCC Physics Program  
*1st Floor Lounge • Grades 3—College*

Come see the designs created at the egg drop exhibit (building station located in the outdoor tent)! The eggs and their protective devices will be dropped from the 2nd floor balcony at: 11 a.m., 12 p.m., 1 p.m., and 2 p.m. Come see which designs will leave the egg intact.

## Location: STEM Building 2nd Floor

### HCC College for Kids! STEM Programs

HCC Continuing Education & Community Services Division  
*STEM-201 • Grades Pre-K—8*

Learn about careers in science, technology, engineering, and mathematics by participating in a make-and-take coloring activity.

### Lego My Robot

HCC Continuing Education & Community Services Division  
*STEM-201 • Grades 3—8*

Legos are not only fun, but educational! See what problems you can solve using a robot built from Legos that can sense walls, follow a trail, and kick a ball.

## **Location: STEM Building 2nd Floor**

### **Discovering Robotics!**

HCC Engineering Program  
*STEM-201 • Grades 3—College*

Are you interested in learning how robots operate? Take this opportunity to investigate how robots work through a series of hands-on experiments using LEGO Mind-storm robotics kits. You will have the opportunity to program a robot to perform a task and watch your robot in action!

### **Physical Science Lessons for Kids**

HCC Physical Science Program  
*STEM-203 • Grades Pre-K—8*

See hands-on lessons on static electricity, magnetism, density, solar power, chemistry, and more! Every lesson includes an exciting demonstration and a token to help participants remember the lesson. HCC physical science students (many of whom are future educators) are excited to share these lessons with you!

### **Music Technology**

HCC Music Department  
*STEM-203 • Grades 6—College*



Stop by and compose your own music on the computer using technology! Then let STEM nerds explain how sound waves can be recorded, generated, and manipulated to create everything from a simple song to an orchestral piece. Compose your own music or rearrange a familiar piece of music. Everyone likes to make music!

### **Simple Harmonic Motion & Physics “Phun”**

HCC Physics Program  
*STEM-203 • Grades 3—College*

Learn about simple harmonic motion and how it relates to music. This exhibit will feature many examples of simple harmonic motion that you can see and several instruments that you can use to create a simple harmonic motion that generates sounds waves that are “music to the ears!” Don’t miss out on this opportunity to learn about physics from HCC faculty!

### **Energy Efficiency of Various Light Bulbs**

HCC Alternative Energy Technology Program  
*STEM-208 • Grades 9—College*

Visit the alternative energy technology laboratory to see a demonstration on the difference in efficiencies of various light bulbs currently available for home use. Find out if your own home lighting is efficient.

### **Robots and Solar Cars!**

Shepherd University  
Engineering Program  
*2nd Floor Patio • Grades 6—College*

Be amazed by robots that will compete in a fire fighting contest and a mechanical warfare contest. Learn about solar energy and how the sun’s energy can be harvested to move a solar car. Find out more about careers in engineering by speaking to professors and students from Shepherd University.



## **Location: STEM Building 2nd Floor**

### **Popcorn from a Solar Trainer**

HCC Alternative Energy  
Technology Program

*2nd Floor Patio • Grades Pre-K—8*

See a demonstration that uses solar power to produce popcorn you can eat! Be amazed at how the sun can

produce energy to drive the popcorn machine. Learn about the HCC Alternative Energy Technology Program and Alternative Energy Club.



## **Location: STEM Building 3rd Floor**

### **Exploring the DNA of Strawberries**

Claud E. Kitchens  
Outdoor School at Fairview  
*STEM-301 • Grades 6—12*

Have you ever wondered where DNA is found or what it looks like? DNA is contained in the cells of every plant and animal, including those that we use as food. This interactive exhibit will allow participants to extract DNA from strawberries using common household products.

### **Fruit Research at the U.S. Department of Agriculture**

USDA - ARS Appalachian Fruit  
Research Station  
*STEM-301 • Grades Pre-K—College*

Learn what scientists at the Appalachian Fruit Research Station in Kearneysville, W.Va., are doing to identify critical problems of temperate fruit production to maximize the productivity and quality of fruit crop while minimizing the adverse effects of biotic and environmental factors on the crops. Participate in various activities, such as DNA isolation from fruit, see fruit trees in a jar, and examine live insects.

### **Aquaculture Research at the USDA**

National Center for Cool  
and Cold Water Aquaculture  
*STEM-301 • Grades 9—College*

Learn how scientists are enhancing the nation's aquaculture production by developing improved germplasm and technologies that increase farm efficiency, product quality, and environmental sustainability. Explore biotechnology careers in genetics, genomics, physiology, aquatic animal health, and aquaculture engineering!

### **From Low-Tech to High-Tech Chromatography**

HCC Biotechnology Program  
*STEM-302 • Grades 3—College*

Scientists use many ways to isolate molecules for biotechnology uses. For example, chromatography is a common and surprisingly easy separation technique. In the research world, "high-tech" systems like column chromatography and High Pressure Liquid Chromatography (HPLC) are used. Come see the equipment required for these techniques exhibited and explained. Or, for a more fun approach, take

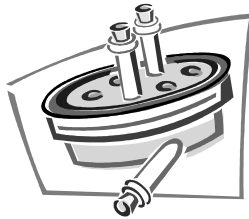
## Location: STEM Building 3rd Floor

part in “low-tech” chromatography that can also separate molecules. Get some hands-on fun with paper chromatography that can be used to separate the colors in ink pens!

### Centrifuge Technology

LABREPCO, Inc.

STEM-302 • Grades 6—College



Visitors will homogenize cellular materials and separate components of the resulting mixture using

centrifuge technology. Several models of centrifuge, including the Sorvall Legend used in the biotechnology laboratory, will be available to demonstrate the effects of improved technology on the function of this important equipment in the modern biotechnology lab.

### The Tiny World of Living Things— Microbes!

HCC Biology Program

STEM-304 • Grades 6—College

The microbiology staff and students at HCC invite you into their lab so you can see microbes in action! See how they use technology to observe microbes, grow them, and identify them. You will learn about microscopic displays, biochemical identification testing, antibiotic sensitivity determinations, and other current techniques for studying microbes. Make a slide of pond water and observe the invisible world of microbes that are all around us!

### Microscope Mania

Catoctin Creek Nature Center

STEM-304 • Grades Pre-K—8

Explore natural and man-made items under magnifying lenses, traditional microscopes, and digital microscopes. Examine some cool prepared slides and live specimens, and compare the microscopic view to digital images. Learn about the history of microscopes and how continually evolving technology changed our view of the world!

### Examine the Health of a Local Watershed

HCC Biology Program

STEM-305/Hall • Grades 3—College

Learn about the Chesapeake Bay by examining a local watershed. This display will include maps, photos of a stream, and stream organisms. Find out what students at HCC have discovered about local stream health based upon a capstone research project for the Biology Program. Use magnifying glasses to look at live animals (macro-invertebrates) found in local streams.

### STEM and Stream Studies

Potomac Heights Elementary School

STEM-305 • Grades 3—12

A student show case of 21st century skills and technology will be used to determine the health of streams located throughout Washington County, Maryland. Student demonstrations will include GPS/GIS technology, Web 2.0 tools, and hand-held electronic devices used in research to collect, analyze, and display stream data.

## Location: STEM Building 3rd Floor

### Small Wonders

HCC Biology Program

STEM-307 • Grades 3—College

View special slides covered in microbial film with the help of a presenter. Use keys, guides, and handouts to interpret what you see under the microscope!

### The Tree of Life

HCC Biology Program

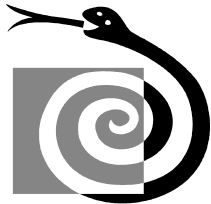
STEM-307 • Grades 6—College

Learn about the relationships between various organisms. Participants will choose an organism at random from a bin. The leaf-shaped “organism” card will contain a picture and name of the organism plus two to three important characteristics of the organism. Using the clues, pin the organism on a large “tree of life.”

### Scales and Tales Wildlife Display

Cunningham Falls State Park

STEM-308 • Grades Pre-K—College



See a variety of live birds of prey and reptiles with naturalists on hand to answer questions, educate, and inspire. Visitors will be

able to touch feathers, skins, and shells. The Scales and Tales programs will educate and inspire people of all ages to conserve and value the natural world!

### Gone Fishin' - Fish Prints

HCC Science Club

STEM-308 • Grades Pre-K—5

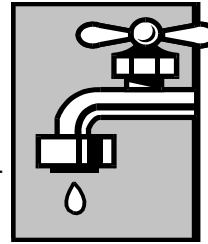
Learn about different species of fish found in our local area. Visitors will have an opportunity to create and decorate your own fish and add it to a mock ecosystem.

### HCC and Water Quality

Washington County Department of Water Quality and the HCC Digital Instrumentation & Process Control Program

STEM-313 • Grades 9—College

Stop by this exhibit and learn how students in the HCC Digital Instrumentation and Process Control



Program are collaborating with engineers and technicians updating the control of key processes at the Washington County Department of Water Quality. Learn about SCADA and how it ties in to almost every complex process in today's world. Stop by and see the state-of-the-art laboratory and think about a career in the growing area of micro-processor-based instrument technology. A short presentation will be given at 10:30 a.m., 11:30 a.m., 12:30 p.m., and 1:30 p.m.

## **Location: STEM Building 4th Floor**

### **Computer-Aided Design and 3-D Printing**

HCC Mechanical Engineering  
Technology Program

*STEM-401 • Grades 3—College*

Visit this exhibit to see a showcase of Computer-Aided Design (CAD) drawings produced by HCC students. You will also have an opportunity to see three-dimensional models printed from HCC's high-tech 3-D printer.

### **Behind the Scenes of the STEM Building**

HESS Construction

*STEM-401 • Grades 9—College*

At this exhibit, you will have a chance to talk to the contractors who played a key role in building HCC's STEM Building. HESS construction staff will be on-hand to explain unique features of the building. Observe a high-tech, multi-dimensional BIM diagram of the building, and find out how the contractors developed this beautiful state-of-the-art building from the ground up!

### **Will it Float? Pennies in a Boat!**

University of Maryland Extension

*STEM-402 • Grades 6—12*

Think like a scientist! Investigate the scientific concepts of weight distribution, surface area, and buoyancy in this wonderfully wet activity. Construct like an engineer! Design, build, and test your own aluminum foil boat to determine its capacity for coins. Challenge yourselves and others! Compare and utilize results to create the best design.

### **Float Your Boat**

St. Mary Catholic School

*STEM-402 • Grades Pre-K—8*

Display Archimedes' principle of buoyant force. This exhibit will challenge visitors to build a tin foil boat that will hold pennies. Predict how many pennies your boat can hold. Test the design by adding one penny at a time. Keep going until the boat sinks! Then count the pennies in your boat.

### **Are You Healthy?**

HCC Fitness Center

*STEM-404 • Grades Pre-K—8*

Stop by and see how the HCC Fitness Center uses technology to determine your level of health. The Fitness Center uses a number of instruments to measure baseline numbers, such as heart rate, blood pressure, body mass index, and body fat percentage. Each evaluation takes only minutes to complete and gives an accurate reading. How does bioelectrical impedance work, and why is it beneficial to learn about? HCC's Fitness Center can show you and explain the method behind it all!

### **Exploring the Human Body**

HCC Biology Program

*STEM-404 • Grades 3—College*

The human body is fascinating. Students at HCC study the human body in their sciences courses, such as anatomy and physiology. Have you ever seen a real brain? Have you tested your reflexes? Have you touched a lung and

## **Location: STEM Building 4th Floor**

watched it inflate before your eyes? Have you heard the heartbeat of an unborn child? Have you ever observed your own heart beat through a stethoscope? Visit this exhibit to find out more about your body.

### **Count Galaxies with the Hubble Telescope!**

MD Space Grant Consortium and Johns Hopkins University  
*STEM-405 • Grades 6—8*

Images from the Hubble Space Telescope will be used to estimate the total number of galaxies in the universe. Related activities will use images to classify galaxy types. This is surely to be out of this world!

### **The Universe and You**

MD Space Grant Consortium and Johns Hopkins University  
*STEM-405 • Grades 6—8*

Professor Henry from Johns Hopkins University will showcase physics activities for visitors of all ages. Experience a microchannel plate, sheets of Polaroid, and much, much more! This station will surely be hands-on fun with lots of educational components.

### **STAR LAB**

William Brish Planetarium  
*STEM-405 • Grades Pre-K—College*

Come to the STAR LAB and ask questions about the night sky. Included will be descriptions of how astronomers use math, science, engineering, and technology to learn more about the night sky. Learn more about the June transit of Venus!

### **STEM Confluence at a Middle School**

The Banner School, Frederick MD  
*STEM-407 • Grades 6—8*

STEM— is it math, science, engineering, or technology? Students from grades 5-8 will showcase projects from math and sciences courses. Each project has an overlap of two or more STEM components. Learn how students approached their problems and hypotheses. See the new generation of STEM!

### **Don't Lose Your Marbles**

Old Forge Elementary School  
*STEM-407 • Grades Pre-K—5*

Design and build a freestanding structure that has a track on which a marble can travel. Points will be rewarded for the height of the structure, number of right angle turns, marble staying on track and marble landing in container at the end of the track. Visitors will use straws, Q-tips, index cards, clay, tape and a cup to build their track. Also see several student STEM projects at this exhibit!

### **Nursing Education Goes High Fidelity**

HCC Nursing Program  
*STEM-409 • Grades 9—College*

Visitors are invited to stop by this exhibit and meet Noelle and Baby Hal, two of HCC's high fidelity nursing simulators. Find out how students at HCC use the simulators throughout their studies in the HCC Nursing Program. Learn about careers in healthcare and medicine.

## Location: STEM Building 4th Floor

### Technology Saves Lives

Meritus Health

STEM-409 • Grades 6—College

Meritus Medical Center, which opened in December 2010, is equipped with the latest lifesaving healthcare technology. Meritus Health's exhibit will offer visitors a visual display of the equipment available in the new facility, as well as general information on the programs and services for patients through the region. Stop by and learn about advanced lighting systems in the operating rooms, the hyperbaric chamber for wound healing, and much, much more!

### Ask Your Pharmacist!

HCC Pre-Pharmacy Program  
and Home Care Pharmacy

STEM-409 • Grades Pre-K—8

Do you have any questions for your pharmacist? How do drugs act? Which drugs interact with each other? Can I take this drug if I am pregnant? How can I save money on my medications? Bring your questions to the pharmacists from Home Care Pharmacy to get some answers. Do you want to become a pharmacist? Speak to a representative from HCC's Pre-Pharmacy Program, and find out how to pursue a career in pharmacy.

## Location: STEM Building 5th Floor

### Gases Are All Around Us

HCC Chemistry Program

STEM-501 • Grades 3—8

Explore the properties of gases as they expand, contract, and bubble through a liquid. Demonstrations will show the effects of carbon dioxide gas on the pH of a solution and how fire extinguishers work.

### The Periodic Table of Cookies

HCC Chemistry Program

STEM-506 • Grades Pre-K—College

Challenge your knowledge about the elements of the periodic table. Answer a riddle about an element and enjoy a delicious cookie featuring its chemical symbol. Visit early and see the entire periodic table of cookies intact.

### Fun with Organic Chemistry

HCC Chemistry Program

STEM-503 • Grades 6—College



Chemistry students at HCC will show how organic chemistry is a part of everyday life.

There will be a focus on large polymer molecules, such as synthetic polymers, lipids, and carbohydrates. Make gak, investigate the lipids found in milk, learn about chromatography, and explore the properties of soap.

### Edible Chemical Molecules

Grace Academy

Science Department

STEM-506 • Grades 6—8

Build molecules using components made of food! Use chocolate covered pretzel sticks and bits, peanut butter balls, and M&Ms to represent atoms. Learn how oxygen atoms, carbon atoms, and hydrogen atoms bond together to make sugars. Learn how other molecules fit together. This exhibit will offer endless possibilities!



## Thank You to Our Sponsors



[www.hagerstowncc.edu](http://www.hagerstowncc.edu)

*Stay close. Go far.*