

“Reading Keyboard Input”, “Addition and Subtraction”, “Multiplication and Division”, “If”, “If Else”, “Nested If”, “Logical Operators”, “Random Numbers”, “For Loop”, “While Loop”, “Nested Loop”, “Function Calls”, “ArrayLists”, and “Arrays.”

### Education

THE SPEED EXHIBITION. C. Mills<sup>1</sup>, E. G. Maurakis<sup>2</sup>, R. Conti<sup>2</sup>, L. Hughes<sup>2</sup>, & D. Hagan<sup>2</sup>, <sup>1</sup>College of William & Mary, Williamsburg VA 23187 and <sup>2</sup>Science Museum of Virginia, Richmond VA 23220. Objectives of the 10,000 ft<sup>2</sup> exhibition gallery project include creating interactive exhibit experiences to challenge visitor’s assumptions, changing their perceptions about the universe and themselves, gaining fascinating scientific insight, and reflecting on their own or with others so they are better prepared to have an informed opinion of the world around them. The SR-71 Blackbird aircraft, suspended over the exhibition, will serve as the icon for the Speed exhibition. Front-end evaluation informed SMV personnel of the understanding level of the concept of speed by visitors as well as strategies to convey topics. Most visitors associated the concept of speed with fast change over time, and did not consider evolution and geologic processes as such. However, after being presented the concept of change over long periods of time, visitors acknowledged that both evolution and geologic processes fit the concept of speed. Over 40 interactive exhibits have been designed to create an atmosphere of wonder by communicating STEM concepts in ways that are insightful and assured as well as surprising and quirky. The overarching theme is change over time, a perspective crucial for understanding scientific concepts – from the speeds of light and sound, expansion of the universe, NASCAR racing vehicles, technology, telecommunications, robotics, and growths in human population, plants, and social media to geological changes, evolution, and speciation.

PROMISING PARTNERSHIPS AND PEDAGOGY FOR AFTER-SCHOOL SCIENCE. Charles L. English, Dir. Playful Learning and Inquiry, Science Museum of Virginia, Richmond VA 23220. The Science Museum of Virginia is a center for scientific investigation, building curious minds, inspiring people to dig further into science, or STEM, and how it impacts our daily lives. The Museum’s Mission – Inspiring Virginians to enrich their lives through science – is designed to engage inquiring minds through rich experiences. The social climate has been slowly shifting within the past few years – to address an area that does not get enough attention – to inspire the minds of youth that may otherwise turn away from a scientific endeavor – to grow a STEM Pipeline towards STEM Careers. To this end the Science Museum is evolving. Our goal is not to be a repository for historic science content as much as to evoke inspiration, enthusiasm, and exploration. Learn about the outreach program successes, areas of need, uncovering stories and experiences as we all look to advance our learning community, especially in an informal, after-school setting. Our current partners include Boys & Girls Clubs of Metro Richmond, Higher Achievement, YMCA, 4-H, Communities in Schools, Richmond Public Schools and the Virginia Library Association. The pedagogical approach is aligned with project based or problem based learning which encourages youth to use their own voice and choice in solving task given to them through effective use and implementation of digital media.

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**PLUMBING THE STEM PIPELINE.** Megan K. Healy, Virginia Director of STEM, Commonwealth of Virginia, Richmond VA 23219. Named the best state for STEM jobs, Virginia can only maintain this status if a robust, 21<sup>st</sup> century workforce is produced from the P-20 education and workforce systems. To strengthen this “pipeline”, students need to be excited in elementary school, inspired in middle school and gain foundational skills in high school to go to college or into the workforce. Many leaks and exit points are found in the current system. Not enough students are interested in STEM and if they are, they do not graduate from STEM programs. Virginia STEM is working with businesses and educators to increase the number of globally competitive Virginians to meet the market demands. The goals of Virginia STEM are to inspire the building of a strong STEM workforce and education pipeline, integrate business and education efforts, initiate communication among all stakeholders and innovate promising practices that can be replicated or scaled. With improved coordination at the state level, Virginia will be a global leader in STEM by providing outstanding education and career opportunities.

#### Posters

**RESOURCE USE BY COLLEGE FRESHMEN IN A FIRST-SEMESTER HUMAN ANATOMY AND PHYSIOLOGY COURSE.** Lisa D. Williams, Math, Science and Eng. Div., No. Va. Comm. Coll., Annandale, VA 22003. Students (N=56) in a first-semester human anatomy and physiology course were polled regarding resources used to study for their first lecture exam. Students overwhelmingly reported (91%) using class notes they generated as their primary study resource. More than half the students used the assigned lab manual (64%) or course textbook (58%) when studying. The percentage of students reading course textbooks approximates that of psychology students in another study. Students also formed study groups and utilized books and models in a campus Science Learning Center. Future assessments could determine how often, and how extensively, students are reading and using other study tools, including study guidelines.

**STM 101: A NOVEL TEAM TAUGHT UNIVERSITY/HIGH SCHOOL ENTERPRISE, PHASE II.** H. A. Rowe<sup>1</sup>, M. E. Anderson<sup>1</sup>, C. E. Bonner<sup>1</sup>, J. D'Silva<sup>1</sup>, A. Fernando<sup>1</sup>, D. Geddis<sup>1</sup>, C. Hinds<sup>1</sup>, M. O. Keeve<sup>1</sup>, H. Kinlaw<sup>1</sup>, L. Salary<sup>1</sup>, P. M. Konopnicki<sup>2</sup>, & S. L. Sutton<sup>2</sup>, <sup>1</sup>Norfolk State University, Norfolk, VA 23504 and <sup>2</sup>Virginia Beach Public School System, Virginia Beach, VA 23456. NSU is in the second year of a partnership with VBPS to teach a novel course: STM 101. Qualified HS students received elective credit for completing this course which involves separate team taught modules on Comp. Sci, Chemistry, Physics, Biology, Technology, Engineering, and Math. This course was taught from a central location remotely to the students in their high schools. The purpose of the program was to give the students a “taste” of the various STEM disciplines and to inform the students about STEM topics

and careers and college in general. The aim was for these students to consider college as an option and specifically a STEM discipline as a major. The modules were presented by enthusiastic faculty using demonstrations, laboratory exercises, and hands-on activities to stimulate the students. Participants were administered a questionnaire to assess this program. Students indicated that due to this class they are more likely to attend college and have a more favorable attitude towards pursuing a major in a STEM field. While the students, and high school student mentors are more satisfied with the Phase II remote delivery of this course, NSU faculty indicates it is still a problem. Both high school and NSU faculty indicate that getting the students to turn in assigned work is a problem. These perceptions have not changed significantly from Phase I. Changes to address these concerns are being planned.

### Environmental Science

MICROBES IN COMPOST. Katherine B. Mireles & Carolyn Thomas, Ferrum College, Ferrum, VA. The purpose of this project was to determine the effects of composts age on the microbial composition of compost. Four compost samples were collected from the composting bins at Ferrum College in October 2013 and January 2014. The samples encompassed the various stages of the composting process (mesophilic, thermophilic, and curing). The actual temperature of the samples ranged from 0-39°C. The temperature of the compost was believed to have a large impact on the microbial composition. Fungi genera (*Aspergillus*, *Penicillium* and *Mucor*) were similar in both samples collected in October 2013. Similarly the bacteria genera, (*Staphylococcus* and *Bacillus*) were similar in the two October samples. When comparing the samples from the two collection dates, there were more differences in the variety of species of both bacteria and fungi. In January there were no cocci shaped bacteria present in any of the samples collected. *Bacillus* was the most commonly found genus of bacteria found with three out of 15 bacterial colonies isolated being *Bacillus*. *Staphylococcus* was the second most common genera found in the samples collected in October with three out 15 isolated bacterial colonies being identified as *Staphylococcus*.

STATUS OF A CONSTRUCTED WETLAND MITIGATION SITE IN SPOTSYLVANIA COUNTY, VIRGINIA. Michael L. Bass, Robert Ericson, Zack DelGrosso, & Rebecca Conway, Dept. of Earth & Environmental Sciences, University of Mary Washington. The purpose of this project was to analyze the health of two streams that run through Spotsylvania County, Virginia, Massaponax Creek and the Ni River. While Massaponax Creek is an urban tributary and flows through highly developed residential, business, and commercial areas, the Ni is an example of a more rural territory. Together, the streams illustrate the effects of urban development. Massaponax Creek has four sampling locations, while the Ni River has three. For each site, pollution levels were implied through a combination of macrobenthic sampling and water chemistry analyses such as phosphate and nitrate concentrations, total suspended solids and total dissolved solids, and fecal coliform levels. The results were compared to previous research to best identify how stream health changes over seasons. According to the macrobenthic results in the fall, nearly all sites saw an increase in