

2022 Prince William-Manassas Regional Science and Engineering Fair Senior Division Program

Animal Sciences

Project #	Students	School	Grade	Project Title & Research Question
ANI- HS-1	Vaishnavi Burra Agnes Cho Alyssa Kane	The Governor's School at Innovation Park	11	The Effects of Toxicity Levels of Selected Homeopathic Remedies on the Satisfaction Levels of <i>C. elegans</i> Which level of the selected homeopathic remedies results in the highest satisfaction levels of the <i>C. elegans</i> ?
ANI- HS-2	Seth Kellogg	Seton School	9	A Deadly Problem: Determining the Efficacy of Naturally-Occurring Mosquito Attractants What geosmin-producing substance is most effective at attracting mosquitoes?
ANI- HS-3	Ellie Kim	Gainesville High School	10	Assessing the Effect of Selected Medicinal Herbs on the Fertility of <i>Drosophila melanogaster</i> How do <i>Ginkgo biloba</i> and echinacea affect the fertility of <i>Drosophila melanogaster</i> ?
ANI- HS-4	Rania Lateef	Colgan High School	9	Dozing off with <i>Drosophila</i>: The Effect of Disrupted Sleep and Circadian Rhythms on Mood, Addiction, and Mortality Do flies who have a Tim01 mutation or flies who are subjected to sleep disruptions demonstrate diminished lifespans, increased consumption of caffeine containing food, and behaviors associated with depression?
ANI- HS-5	Iqra Ahmad Keren Gonzaga Thu Luong	The Governor's School at Innovation Park	12	Evaluating the Efficacy of Selected Phytoestrogens in Promoting Neuroprotection and Preventing Neurodegeneration in <i>Caenorhabditis elegans</i> How do various isoflavonic phytoestrogens impact cognitive abilities and neurodegeneration rates in wild-type and transgenic human A β -treated <i>Caenorhabditis elegans</i> ?

Behavioral Sciences

Project #	Students	School	Grade	Project Title & Research Question
BEH- HS-1	Haley Fifield	Seton School	9	Stage Fright? What is the effect of recording someone, and the investigator being present, on their efficiency doing mental tasks?
BEH- HS-2	Connor Wilber Kristina Jernigan	Osborn Park High School	9 & 10	Effect of Anonymity on the Prisoner's Dilemma If someone is forced to make public decisions, will they be inclined to choose a more altruistic or self-preserving option?

Project #	Students	School	Grade	Project Title & Research Question
BEH- HS-3	Maanini Lakshmanan Bethelle Lanquaye Chloe Musman	The Governor's School at Innovation Park	11	The Effects of Niacinamide, Ascorbic Acid, and Coenzyme Q10 on the Vitality and Mobility of <i>Caenorhabditis elegans</i> Which dosages of niacinamide, ascorbic acid, and coenzyme Q10 will exhibit the most signs of increased vitality and mobility amongst <i>Caenorhabditis elegans</i> , while also maintaining the lowest ratio of dead: live organisms?
BEH- HS-4	Layla Moussavi	Colgan High School	10	Perception of Healthy Eating Habits Among Teenagers What factors affect participants' understanding of nutritional content of pre-packaged foods?

Biochemistry

Project #	Students	School	Grade	Project Title & Research Question
BCH- HS-1	Anna Russo	Seton School	9	Rise of the Yeast What is the effect of the temperature of water on the fermentation of yeast?
BCH- HS-2	Comfort Ohajunwa Jadesola Akinbi	The Governor's School at Innovation Park	12	A Study on Biofuel Production: Investigating Methods to Enhance Fermentation in the Production of Bioethanol Does the addition of the enzyme xylanase to lignocellulosic biomass enhance the production of bioethanol?
BCH- HS-4	Khadeejah Alsheikh Jestelle Ignacio	Osbourn Park High School	9	Using Different Types of Biomasses to Affect the Rate of Biogas Production: Creating Biogas Using Cow Manure How do different types of biomasses effect the rate of biogas production?

Chemistry

Project #	Students	School	Grade	Project Title & Research Question
CH- HS-1	Jacqueline Hugo	Seton School	9	Power It Up! What is the effect of external temperature on the voltage remaining in the battery after 1 week?
CH- HS-2	Madison Nepomuceno	Gainesville High School	9	The Effect of Cooking Oil Viscosities on the Speed of a Marble What is the effect of cooking oils and their viscosities on the speed of marbles?
CH- HS-3	Skye Auger	Osbourn Park High School	10	Examining the Acidic Corrosion Rate of Iron Is the corrosion rate of iron affected by different acid types?
CH- HS-4	Diego Luque	The Governor's School at Innovation Park	11	Observing Oxidants: Measuring the Effect of Different Iron Oxidizing Agents on Iron Oxidation Filtration What is the most effective oxidizing agent to use for the purpose of iron oxidation filtration?

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CH-HS-5	Beverly Appouh	The Governor's School at Innovation Park	10	Bioplastic Straws What type of vegetable, cornstarch, tomato, or spinach, will help homemade bioplastic degrade the fastest?
CH-HS-6	Kyrene Phan Sarah Fernandez	Colgan High School	12	Don't Yearn for Burns Which sunscreen brand is the most effective against UV radiation?
CH-HS-7	Sejal Sharma Nawah Ahmad Jennine Faruque	The Governor's School at Innovation Park	12	Direct Air Capturer: The Effect of a Direct Air Capturer on the Reduction of Carbon Dioxide What is the effect of a direct air capture system that chemically alters carbon dioxide tested in different locations on the system's ability to decrease carbon dioxide levels?

Computational Biology & Bioinformatics

Project #	Students	School	Grade	Project Title & Research Question
BI-HS-1	Ebru Ayyorgun	Battlefield High School	11	A Novel Visualization Tool: Application to RNA-sequence Classification How can high dimensional datasets be better visualized? How can this novel visualization tool be applied to better analyze RNA-sequence data for atherosclerosis? How do various genes, disease stages, and demographics impact atherosclerosis development?
BI-HS-2	Raj Joshi Benjamin Dries Abdullah Khurram	The Governor's School at Innovation Park	12	Measuring Relative Inhibition of Pain-Causing Enzymes with Various Analgesics From acetaminophen, ibuprofen, and naproxen sodium, which of these three analgesics will inhibit the COX-1 enzyme the least? How will the relative inhibition of COX-1 correlate with gastrointestinal side effects for each drug?

Engineering

Project #	Students	School	Grade	Project Title & Research Question
ENG-HS-1	Humzah Shaikh Rahat Bhuiyan Gabriel Estrella	The Governor's School at Innovation Park	11	The Effect of Thermal Transfer on Space Heating Efficiency Is there a significant increase in the heat efficiency of a building when room to room thermal transfer is applied compared to heating the entire building?
ENG-HS-2	Adhikari Utsav Kineab Melkamu Nelson Palacios	The Governor's School at Innovation Park	11	Thermal Imagery in Transportation How can thermal imagery be used to improve and increase transportation safety?

Environmental Science

Project #	Students	School	Grade	Project Title & Research Question
ENV- HS-1	Mehreen Rahman Kevin Sae-Tung	The Governor's School at Innovation Park	12	The Effect of Copper Sulfate on the Ability of <i>Ulva lactuca</i> to Prevent Critical Levels of Nutrients in Water What is the effect of copper stress on <i>Ulva lactuca</i> 's ability to prevent eutrophication?
ENV- HS-2	Desmen Boykin	The Governor's School at Innovation Park	11	The Effect of Casein Polymers on the Filtration of Heavy Metals and Contaminants in Well Water Can the usage of casein enhance the performance of a charcoal filtration system by the use of the structural components of the casein biopolymer?
ENV- HS-3	Alexis Andrews Kiara Turner Alexandra Roberson	Colgan High School	12	Water Filtration: The Key to Healthier Living Which water filtration device best purifies the three different types of water: creek water, city (tap) water, and bottled water to the 50-150 ppm range?
ENV- HS-4	Melissa George Fayza Mehrin	Osborn Park High School	10	Evaluating the Rate of Microplastic Filtration on <i>Mytilus edulis</i> What is the rate of microplastic filtration of <i>Mytilus edulis</i> ?
ENV- HS-5	Manreet Cheema	The Governors School at Innovation Park	11	The Effect of PET Plastic on the Survival Rate of Brine Shrimp To what degree does having PET Plastics in the water change the survival of brine shrimp?

Mathematics

Project #	Students	School	Grade	Project Title & Research Question
MAT- HS-1	Sana Amer	Battlefield High School	10	The Effect of Predictive Algorithm Method on Forecasting Nonlinear Data Which predictive algorithm is best suited for forecasting nonlinear data?

Medicine & Health Sciences

Project #	Students	School	Grade	Project Title & Research Question
MED- HS-1	Milania Dehring	Osborn Park High School	10	A Quantification of Superficial Subcutaneous Adipose Tissue and Deep Subcutaneous Adipose Tissue Through Abdominal Computed Tomography Images What is the surface area of sSAT compared to dSAT at the inferior view of the L4-5 level abdominal CT scan?

Project #	Students	School	Grade	Project Title & Research Question
MED-HS-2	Divya Ramakrishnan Hermela Tadesse Soneha Datta	The Governor's School at Innovation Park	12	The Effect of Natural Plant Extracts on <i>C. elegans</i> as a Means of Limiting UV Radiation Damage What plant extract between <i>Garcinia mangostana</i> , <i>Melissa officinalis</i> , and <i>Olea europaea</i> will protect <i>C. elegans</i> from UV radiation the most effectively, therefore suggesting the strongest promotion of melanogenesis?
MED-HS-3	Hamza Lateef Tony Bright Gabriel Ralston	The Governor's School at Innovation Park	11	Concussion Recovery in Youth Optimized using a Comprehensive App-based Program (CRYO CAP) Can we study the effects of concussion in a validated animal model (<i>Drosophila melanogaster</i>) and determine whether therapeutic hypothermia could mitigate neurocognitive impacts? Can we engineer a device (CRYO CAP) that delivers consistent cerebral hypothermia, to an athlete who has suffered mild TBI, using app-based technology to diagnose the concussion and monitor recovery?
MED-HS-4	Christina Fernandez Bethel Abebe	The Governor's School at Innovation Park	11	Quantifying the Degradation and Adherence of <i>Staphylococcus epidermidis</i>' Biofilms When Exposed to Select Proteolytic Enzymes on Hydrophilic and Hydrophobic Surfaces What is the effect of proteolytic enzyme exposure on the adherence and degradation of <i>Staphylococcus epidermidis</i> ' biofilms on hydrophilic and hydrophobic surfaces?

Microbiology

Project #	Students	School	Grade	Project Title & Research Question
MCB-HS-1	Molly Bauer	Seton School	9	Germ Busters What is the effect of different disinfectants on bacteria growth?
MCB-HS-3	Anisha Ramakrishnan Gabriella La Cour Alahna Moreno	Osborn Park High School	11	Creating Novel Bacteriophage Solutions as a Preventative Measure for <i>Escherichia coli</i> Biofilm Formation on Elastomer Biomaterials in Medically Relevant Settings in Vitro Will adding T4 bacteriophage, along with the common peracetic acid mixture, be a more effective method of sterilizing elastomer biomaterials infected by <i>E. coli</i> than methods used today?
MCB-HS-3	Rajitha Anbu Laaibah Tayyeb Jack Pierce	The Governor's School at Innovation Park	12	Alternative Medicine on the Overgrowth of Micro Bacteria in the Gut and Serotonin Production in the Brain Which type of herb will be most effective in being able to stunt the overgrown <i>E. coli</i> in the human gut, and does this decrease of <i>E. coli</i> in the human gut decrease symptoms of anxiety and depression?
MCB-HS-4	Clare Flynn	Seton School	10	SODIS is Clean Water? How long does it take the SODIS method of water disinfection to purify pathogen contaminated water to a level safe for drinking?

Physics

Project #	Students	School	Grade	Project Title & Research Question
PHY- HS-1	Lukas Vargas	Manassas Park High School	10	An Analysis of the Effect of a Compounding Polymer on Elasticity How will the elasticity of a polymer chain progress as multiple chains are wrapped around each other?
PHY- HS-2	Orla Haggerty	Seton School	9	Race to the "Fin"ish What is the effect of different shaped hydroplanes on the speed of a torpedo?
PHY- HS-3	Liam Powell	Osborn Park High School	10	The Effect of Optical Lens Type on Light Pollution in Streetlights How do different lens types affect the severity of light pollution in the atmosphere?
PHY- HS-4	Simran Patibanda Kaylyn Nguyen	The Governor's School at Innovation Park	12	The Effect of Rotational Direction on the Power of Relativistic Jets Emitted from Active Galactic Nuclei How does the prograde or retrograde motion of Kerr supermassive black holes affect the power of relativistic jets emitted from active galactic nuclei?
PHY- HS-5	Hasnain Younas	Forest Park High School	11	The Quantum Flywheel on Colonial Mars Does the damping of a rotating flywheel caused by flux lines inside the superconductor when spinning make it impractical for energy storage in interstellar space and on Mars colonies?
PHY- HS-6	Kalea Wen Ari Poisik	The Governor's School at Innovation Park	12	The KadomSTev-Rosenbluth Initiative: The Effect of Toroidal Field and Internal Plasma Current Strengths on the Presence of Magnetic Island MHD Instabilities in a Tokamak Fusion Device Do tokamak input parameters influence magnetic island presence and if so, how?

Plant Sciences

Project #	Students	School	Grade	Project Title & Research Question
PLT- HS-1	Hannah Leeds	Seton School	9	The Best Way to Preserve Freshly-cut Carnations What remedy would work best to preserve freshly-cut carnations as long as possible to save money, time, and effort?
PLT- HS-2	Caden Colangelo	Colgan High School	11	The Effect of Different Color Lighting on the Photosynthesis Rate of Algae What color lighting produces the highest photosynthesis rate in algae?
PLT- HS-3	Naman Agarwal	The Governor's School at Innovation Park	11	A Low-Cost Deep Learning Solution for Early Detection of Lettuce Stress in Indoor Farms How can a system affordably provide crop health maps that signal to vegetation stress before it is visible for indoor farms?

Project #	Students	School	Grade	Project Title & Research Question
PLT- HS-4	Makenna Howell	Osbourn Park High School	10	The Effect of Probiotics on the Growth in Height of Lima Bean Plants How does the type of probiotic affect the growth in height of lima bean plants?