**Bringing Space to the Middle School CTE Classroom Agenda July 2023**

***All sessions are in Kaufman Hall, Room 239 except as noted.***

**July 10:**

| Duration/Type | Description |
|---|---|
| **Introducing Technology** | |
| **9:00 am - 12:00 pm Discussion and Activity** | **Welcome**<br>• ***Mary Sandy Director Emeritus, Virginia Space Grant Consortium (VSGC)***<br>• ***Dr. Vukica Jovanovic, Chair, Engineering Technology Department, Batten College of Engineering, Old Dominion University (ODU)***<br>**Program Overview**<br>• ***Mary Sandy***<br>**Speaker -** ***Artemis: Apollo's Twin Sister, NASA's Plans to Make Humans a Multi-Planet Species***<br>• ***Patrick A. Cosgrove, Portfolio Manager, In-Space Autonomous Assembly, Construction and Outfitting. Space Technology and Exploration Directorate, NASA Langley Research Center***<br>**Ice Breaker Activity**<br>• ***Rudo Kashiri, Education Programs Manager, VSGC***<br>**Old Dominion University: Engineering Technology and Engineering Academic Pathways**<br>• ***Dr. Vukica Jovanovic*** |
| **12:00 pm - 1:00 pm Lunch** | |
| **1:00 pm - 1:50 pm** | **Careers and Career Pathways Speakers**<br>• ***Karen Miller - NASA*** |
| **1:50 pm - 2:20 pm** | **Virginia Peninsula Community College Academic and Workforce Pathways**<br>***Julie Young, Mechanical Engineering Technology Program Head***<br>***Unmanned Systems Program Head***<br>***Science, Technology Engineering and Mathematics (STEM)***<br>***Virginia Peninsula Community College*** |
| **2:20 pm - 2:35 pm Break** | |
| **2:35 pm - 3:05 pm** | **Virginia Space Grant Consortium Programs and Opportunities**<br>***Mary Sandy*** |
| **3:05 pm - 3:35 pm** | **What do you know about Space and Aerospace Careers? Kahoot session with prizes.**<br>***Mary Sandy*** |
| **3:35 pm - 4:00 pm** | **Closing. Wrap-up and Introduction of Day 2** |

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**July 11:**

| Duration/Type | Description |
|---|---|
| **9:00 am - 9:15 am Discussion** | **Review events from the day before** |
| **Select materials based on their properties when designing a technology** | |
| **9:15 am - 11:15 am Activity and Discussion** | **Structural Design of Lunar Habitat: Develop an appreciation of the structural design process. Use science concepts to predict design load effects and the strength of structural components. Collect data from tests to draw correlations between test results and design predictions**<br>***Dr. Michael Seek, Civil Engineering Technology, ODU*** |
| **11:15 am - 11:30 am Break** | |
| **11:30 am - 12:00 pm activity and discussion** | **Hands-On Vacuum Environment: Explore the bare necessities of survival in space**<br>***Rudo Kashiri, Education Programs Manager VSGC*** |
| **12:00 pm - 1:00 pm Lunch** | |
| **Identify how technology has emerged through the use of engineering** | |
| **1:00 pm - 3:45 pm Activity and Discussion** | **Technology Innovations: Heat Transfer and Design a Lunar Thermos Session is about heat transfer and how technology has emerged through the use of engineering.**<br>***Dr. Orlando Ayala, Mechanical Engineering Technology***<br>***Manuel Ayala, PhD student at John Hawkins University*** |
| **3:45 pm - 4:00 pm Discussion** | **Daily Debrief** |
| **4:00 pm** | **ODU Lab Tour** |

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**July 12:**

| Duration/Type | Description |
|---|---|
| **9:00 am - 9:15 am Discussion** | **Review events from the day before** |
| **Model electronic circuits used in inventions and innovations** | |
| **9:15 am - 11:15 pm Activity and Discussion** | **Satellites: Orbits and Power Budget: The lesson introduces specific aspects of space exploration and how very basic concepts learned in school are crucial in developing the necessary technology**<br>***Dr. Otilia Popescu, Electrical Engineering Technology, ODU***<br>***Marija Raskovic, Physics, Tidewater Community College*** |
| **11:15 am - 11:30 am Break** | |
| **11:30 am - 12:00 pm Activity and discussion** | **Collecting Light: Inverse Square Law Demo: Learn how light, and energy are spread throughout space. The rate of change can be expressed mathematically, demonstrating why spacecraft like NASA's Juno need so many solar panels.**<br>***Rudo Kashiri, Education Programs Manager VSGC*** |
| **12:00 pm - 1:00 pm Lunch** | |
| **Model electronic circuits used in inventions and innovations** | |
| **1:00 pm - 3:45 pm Activity and discussion** | **Introduction to Electrical Circuits with Snap Circuits kit: The lesson introduces the specific aspects of space exploration and how very basic concepts learned in school are crucial in developing the necessary technology.**<br>***Dr. Otilia Popescu, Electrical Engineering Technology, ODU***<br>***Marija Raskovic, Physics, Tidewater Community College*** |
| **3:45 pm - 4:00 pm Discussion** | **Daily Debrief** |
| **4:00 pm** | **ODU Lab Tour** |

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**July 13:**

| Duration/Type | Description |
|---|---|
| **9:00 am - 9:15 am Discussion** | **Review events from the day before** |
| **Describe the information and communication contexts of technology and engineering** | |
| **9:15 am - 11:15 am Activity and Discussion** | **Remote Sensing and Radio Communications: Demonstrate how to use open-source software to program the radio to track satellites and receive signals, and build a weather satellite antenna to use with the software-defined radio that is in the kit. And they should be able to build a similar antenna with students in their classes.** <br> ***Dr. Dimitrie Popescu, Electrical Engineering, ODU*** |
| **11:15 pm - 11:30 pm Break** | |
| **11:30 am - 12:00 pm Activity and Discussion** | **Deep Space Communication: Explain how NASA communicates with astronauts, satellites, rovers, and other spacecraft. Students will demonstrate how communications work in the DSN by encoding and decoding messages using binary code or hexadecimal.** <br> ***Kari Espada, STEM Education Specialist, VSGC*** <br> ***Shanee Frazier, Master Teacher, VSGC*** |
| **12:00 pm - 1:00 pm Lunch** | |
| **Demonstrate types of measuring** | |
| **1:00 pm - 2:00 pm Activity and Discussion** | **Sounding Rockets and Small Satellites: Learn about space science missions made possible by sounding rockets and small satellites at low-cost budgets.** <br> ***Dr. Dimitrie Popescu, Electrical Engineering, ODU*** |
| **2:00 pm - 2:15 pm Break** | |
| **2:15 pm - 3:45 pm Activity and Discussion** | **Build a Satellite: Lesson provides an understanding of satellites, their use and structure, and power systems. Students will use the engineering design process to design, build, test and improve a model satellite.** <br> ***Kari Espada, STEM Education Specialist, VSGC*** <br> ***Shanee Frazier, Master Teacher, VSGC*** |
| **3:45 pm - 4:00 pm Discussion** | **Daily Debrief** |
| **4:00 pm** | **Lab Tour** |

## Bringing Space to the Middle School CTE Classroom Agenda July 2023

***All sessions are in Kaufman Hall, Room 239 except as noted.***

**July 14:**

| Duration/Type | Description |
|---|---|
| **Research careers and the technology used in them/Careers in Space Explorations** | |
| **7:30 am** | **Bus departs Old Dominion University for NASA Wallops Flight Facility Pick up is at 49th Street and Quarantine** |
| **9:45 am** | **Arrival - Badging Office, NASA Wallops Flight Facility- Meet Tour Escorts, Badging and K9 Inspection** |
| **10:20 am - 11:00 am** | **Tour Fabrication and Testing, Building F-10** |
| **11:10 am - 11:40 am** | **Balloon Program Office** |
| **11:50 am - 12:30 am** | **Range Control Center** |
| **12:35 pm - 1:05 pm Pre-ordered and delivered lunch (Chesapeake Room)** | |
| **1:05 - 1:30 pm** | **Gift Shop** |
| **1:30 pm** | **Depart for Mid-Atlantic Regional Spaceport** |
| **1:45 pm** | **Presentation from Sidney McGee, Director of Educational Talen, Virginia Spaceflight Authority, MARS Conference Room** |
| **2:15 pm - 2:30 pm** | **Depart/Arrive at Spaceport** |
| **2:30 - 3:00 pm** | **Tour of Pads: 0A, OB, OC** |
| **3:00 - 3:10 pm** | **Travel to Airfield and Payload Processing Facility** |
| **3:10 - 4:00 pm** | **Tour of Payload Processing Facility** |
| **6:15 pm** | **Approximate arrival at 49$^{th}$ Street and Quarantine bus stop at ODU in Norfolk** |

## Bringing Space to the Middle School CTE Classroom Agenda July 2023

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**July 17: Kaufman Hall 208**

| Duration/Type | Description |
|---|---|
| **9:00 am - 9:15 am Discussion** | **Review events from the day before** |
| **Create sketches and drawings** | |
| **9:15 am - 12:00 pm Activity and Discussion** | **Introduction to Engineering Design**<br>***Dr. Vukica Jovanovic, Chair Engineering Technology Department, ODU*** |
| **12:00 pm - 1:00 pm Lunch** | |
| **Describe the computation, automation, AI, and robotics contexts of technology and engineering** | |
| **1:00 pm - 3:45 pm Activity and Discussion** | **MARS Rover Robotics: Experience hands-on activities in constructing, assembling, and programming a 3D-printed remote-controlled robot Rover.**<br>***Dr. Steve Hsiung, Electrical Engineering Technology, ODU***<br>***Dr. Walter Deal, Occupational and Technical Studies, ODU*** |
| **3:45 pm - 4:00 pm** | **Daily Debrief** |
| **4:00 pm** | **Lab Tour** |

## Bringing Space to the Middle School CTE Classroom Agenda July 2023

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**July 18:**

| Duration/Type | Description |
|---|---|
| **8:00 am** | **Depart for NASA Langley Research Center via bus**<br>**Bus pick-up at ODU, 49th Street and Quarantine Bus Stop, Norfolk, Va;**<br>**Peninsula participants meet busy at NASA Langley Badge and Pass Office on Commander Shepard Boulevard in Hampton, Va.** |
| **9:00 am - 9:15 am Discussion** | **Badging at NASA Langley Badge and Pass Office on Commander Shepard Boulevard** |
| **Research careers and the technology used in them** | |
| **9:15 am - 12:00 pm Discussion and Tours** | **NASA Langley Research Center**<br>• **Langley Overview**<br>• **Model Shop Tour**<br>• **Fabrication (ISAAC) Tour**<br>• **Structures Tour** |
| **12:00 pm - 1:00 pm Lunch** | |
| **1:00 pm - 3:45 pm Discussion and Tours** | • **Practicing Professional Panel**<br>• **Wind Tunnel Tour**<br>• **Maker Space Tour** |
| **3:45 pm - 4:00 pm Discussion** | • **Daily Debrief** |
| **4:00 pm** | **Depart NASA Langley for return to ODU** |
| **5:15 pm** | **Arrive ODU, 49th and Quarantine Bud Stop** |

## Bringing Space to the Middle School CTE Classroom Agenda July 2023

***All sessions are in Kaufman Hall, Room 239 except as noted.***

**July 19: Kaufman Hall 208**

| Duration/Type | Description |
|---|---|
| **9:00 am - 9:15 am Discussion** | **Review events from the day before** |
| **Describe the computation, automation, AI, and robotics contexts of technology and engineering** | |
| **9:15 am - 12:00 pm Activity and Discussion** | **MARS Rover Robotics: Experience hands-on activities in constructing, assembling, and programming a 3D-printed remote-controlled robot Rover.**<br>***Dr. Steve Hsiung, Electrical Engineering Technology, ODU***<br>***Dr. Walter Deal, Occupational and Technical Studies, ODU*** |
| **12:00 pm - 1:00 pm Lunch** | |
| **Describe the computation, automation, AI, and robotics contexts of technology and engineering** | |
| **1:00 pm - 3:45 pm Activity and Discussion** | **MARS Rover Robotics: Experience hands-on activities in constructing, assembling, and programming a 3D-printed remote-controlled robot Rover.**<br>***Dr. Steve Hsiung, Electrical Engineering Technology, ODU***<br>***Dr. Walter Deal, Occupational and Technical Studies, ODU*** |
| **3:45 pm - 4:00 pm Discussion** | **Daily Debrief** |
| **4:00 pm** | **Robotics Lab Tour** |

## Bringing Space to the Middle School CTE Classroom Agenda July 2023

***All sessions are in Kaufman Hall, Room 239 except as noted.***

**July 20 – Kaufman Hall Room 122:**

| Duration/Type | Description |
|---|---|
| **9:00 am – 9:15 am Discussion** | **Review events from the day before** |
| **Select materials based on their properties when designing a technology** | |
| **9:15 am – 10:15 am Activity and Discussion** | **Test Materials for Radiation Shielding: Use ultraviolet (UV)-sensitive beads to test a variety of materials to determine if they are suitable for shielding against radiation.** <br> ***Kristen Duprey, STEM Education Specialist, VSGC*** <br> ***Shanee Frazier, Master Teacher, VSGC*** |
| **10:15 am - 10:30 am Break** | |
| **10:30 am - 12:00 pm Activity and Discussion** | **Experiment with Water Filtration: Teams to create a water filtration system using an assortment of materials that will produce filtered water with a pH level of 6.5 to 8.5.** <br> ***Kristen Duprey, STEM Education Specialist, VSGC*** <br> ***Shanee Frazier, Master Teacher VSGC*** |
| **12:00 pm - 1:00 pm Lunch** | |
| **Identify the six simple machines that make mechanical technology work** | |
| **1:00 pm - 2:15 pm Activity and Discussion** | **Heavy Lifting: Design and build a crane and see how heavy a load it can lift. Improve the cranes based on the results of their testing.** <br> ***Kristen Duprey, STEM Education Specialist, VSGC*** <br> ***Shanee Frazier, Master Teacher, VSGC*** |
| **2:15 pm – 2:30 pm Break** | |
| **2:30 pm - 3:45 pm Activity and Discussion** | **Roving on The Moon: Design and build a rover out of cardboard, powered by rubber bands to spin the wheels. Use test results to improve their design.** <br> ***Kristen Duprey, STEM Education Specialist, VSGC*** <br> ***Shanee Frazier, Master Teacher, VSGC*** |
| **3:45 pm - 4:00 pm Discussion** | **Debrief** |
| **4:00 pm** | **Lab Tour** |

## Bringing Space to the Middle School CTE Classroom Agenda July 2023

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**July 21 – Kaufman Hall Room 239:**

| Duration/Type | Description |
|---|---|
| **9:00 am - 9:15 am Discussion** | **Review events from the day before** |
| **Demonstrate the use of the Engineering design process** | |
| **9:15 am - 9:35 am Activity and Discussion** | **It's a Drag: Demonstrate the following concepts: drag is a force, drag is created as an object interacts with the air and the amount of drag created is directly proportional to the object's surface area.** <br> ***Kristen Duprey, STEM Education Specialist, VSGC*** <br> ***Shanee Frazier, Master Teacher VSGC*** |
| **9:35 am - 10:35 am Activity and Discussion** | **Touchdown: The activity demonstrates that an object gains energy (speed) as it falls due to gravity pulling downward on the object. To prevent the cargo from being damaged as it landed, it must be protected using energy-absorbing materials.** <br> ***Kristen Duprey, STEM Education Specialist, VSGC*** <br> ***Shanee Frazier, Master Teacher VSGC*** |
| **10:35 am - 10:50 am Break** | |
| **10:50 am - 12:00 pm Activity and Discussion** | **Parachute design: Design a drag device to slow the weighted spacecraft when it is dropped from a specified height (at least 2 meters). Data gathered in this challenge include surface area, mass, and descent time.** <br> ***Kristen Duprey, STEM Education Specialist, VSGC*** <br> ***Shanee Frazier, Master Teacher VSGC*** |
| **12:00 pm - 1:00 pm Lunch** | |
| **Wrap up** | |
| **1:00 pm - 2:00 pm Discussion** | **Plan for academic year professional development** |
| **2:00 pm - 4:00 pm** | **Session with partnering counselors and administrators. Teachers present their plans for integrating Institute knowledge, skills, lessons, and activities into their classroom teaching. Group discussion on how school administration and counselors will support and share information and resources in their schools and districts in alignment with Institute objectives.** |
| **4:00 - 4:30 pm** | **Institute Evaluation and Wrap Up** |