



# U.S. SPACE & ROCKET CENTER

# SPACE ACADEMY FOR EDUCATORS SUMMER 2009



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Space Academy for Educators ®



# Space Academy for Educators



Throughout the week of Space Academy for Educators, educators participate in a wide variety of activities that use space to meet math and science objectives. All activities are correlated to National Science, Math and Reading standards. (See attached pages). Most activities can be adapted to any grade level and most subject objectives, but are mainly designed for 4-9<sup>th</sup> grade.

Each participant will leave with several CDs with all lesson plans, standards and any relevant information to make it easier to adapt these activities to your own class environment. In the summer of 2009, all activities will be made available online to registered alumni.

This is a summary of all the activities that are on the CDs. If you have questions as always, please email <u>education@spacecamp.com</u>

#### Math Activities Martian Math

This highly interactive and energetic session gets everyone up and out of their seats to practice basic skills, factorials, probability and order of operations. These fun activities help students gain confidence and knowledge. These activities are easily adaptable to higher level math concepts and can also be adapted to other subjects.

# NASA's Engineering Design Challenges- Thermal Design

Marshall Space Flight Center sponsors this exciting opportunity for students and schools to replicate engineering challenges faced by NASA engineers. Working under the supervision of their teachers, students design, build, test, re-design, and re-build models that meet specified design criteria. Students employ the same analytical skills as engineers as they improve their designs. In this session, participants attempt to solve some of the previous challenges.

# **Built Environment**

Using measurement, graphing, volume, ratio, scale, proportion and model making, your students will build a moon or mars colony out of found items. Your students will use critical thinking and decision making to create an out of this world environment. Numerous activities using math to solve real world problems.

# **Science Activities**

# **Lunar Stations**

This multi station workshop will help teachers explore various themes as their students would prepare to inhabit the moon. The stations cover rovers, craters, volcanoes, and soil experiments.

#### On to Mars

This workshop contains various activities that will be necessary in the exploration of Mars. Designing the perfect Mars Lander, soil activities, and other fun mars themed activities will get your entire class motivated to be the first explorers to Mars! Activities are provided by the Arizona State University Mars Project.

#### Space Gardening

Participants will be introduced to the STS 114 Mission that launched in August 2007. A fellow teacher, Barbara Morgan was on board! She had many responsibilities on this flight, one of which is the use of a plant growth chamber with basil seeds. Participants will learn more details about her mission, about using hydroponics in space and will design their own plant growth chamber. They will receive seeds that were flown in space and ones left on earth to use in experiments in their classroom.

#### **Toys in Space**

In 1985 & 1993, toys were taken into space so students on earth could learn about how things they were familiar with reacted in microgravity. This workshop utilizes various physics principals, using common toys and the participants predict what will happen to them in microgravity. A DVD to take home is included in this workshop, so students can see exactly how the toys reacted in space.

#### Both Science & Math Rocket Construction

Participants will design, select materials, construct and launch water bottle rockets. Each group will form a "company" as well as assign tasks to each team member. Groups will complete a scaled drawing of the rocket, test for stability and accuracy, and keep a budget. This activity is based on NASA's rocketry curriculum.

Engine Rockets will also be built utilizing higher level math and physics. This workshop will also cover ways to bring rocketry across the high school curriculum. Based on activities developed by Estes and Team America Rocketry Challenge.

#### **Mission Patch**

This hands-on activity allows participants to learn about the history and symbolism of space mission patches. The participants then apply their knowledge in creating a patch that uniquely captures the characteristics of their individual team along with the goals of their simulated mission.

#### **Current Events**

#### Ares

NASA is getting ready to return the moon with a new rocket system, which is being developed at Marshall Space Flight Center. Participants will learn about the similarities and differences with the Saturn V and about the next generation of space flight.

#### Living & Working in Space

Learn about what it is like to live and work in space. Including food, exercise, experiments and how to go to the bathroom. Lots of fun demos and hands on things for your students to do.

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#### History

#### History of Space Program - Speaker

Ed Buckbee, founder of Space Camp, recounts the early days of NASA in Huntsville. Hear about stories from behind the scenes at NASA and Space Camp and receive a copy of his book, *The Real Space Cowboys*.

#### Astronaut Speaker's Power Point Presentation – Story Musgrave

#### **Other Guests Speaker's Power Point Presentation – Homer Hickam**

# Other Activities not covered on the CD Museum

During the week, participants will have time to explore the museum, and counselors will lead discussions regarding the following topics:

History of Space Travel Rocket City Legacy Mercury, Gemini, and Apollo programs Pathfinder and the Shuttle Program Rocket Park Davidson Center for Space Exploration – Restored Saturn V

### **Team Building**

#### MISSIONS

#### Shuttle Orientation

Introduction to the major components of the Space Transportation System, as well as the highlights of a mission sequence, will be discussed in this briefing. The topics are illustrated using hands-on activities that can easily be transferred to the classroom setting. *The power point given is included on the CD.* 

#### **Mission Overview**

Participants will be given an overview of the mission in which they will participate. A description of the different simulation areas of the mission will be given, along with an explanation of astronaut and ground positions and responsibilities. The mission timeline will be reviewed, and an explanation of activities to be conducted and experiments to be performed will be given. *The power point given is included on the CD.* 

#### **Mission Training**

Participants are provided specific, in-depth training on how to conduct their simulated shuttle mission. Training is conducted in all areas of the mission simulation including cockpit procedures, EVA procedures, satellite deployment, scientific experimentation aboard Space Station, and Mission Control responsibilities. Practice time is given in following checklists and solving problems.

#### Shuttle Mission

Participants will conduct a simulated space shuttle missions during the week. Specific activities in the mission include launch and landing of the shuttle, satellite deployment, assembly of a large space structure, and the conducting of experiments while in space. In this scenario, participants are challenged with various types of problems that require teamwork and critical thinking in order to solve the problems and have a successful mission.

#### **Astronaut Simulators**

The unique sensations of space flight are reinforced through the use of simulators, such as the 1/6 gravity chair that allows a person to experience how astronauts trained to walk on the moon. The MMU is a full-sized mock-up of NASA's Manned Maneuvering Unit. The Multi-Axis Trainer allows the participant to experience the dramatic sensation of being aboard a tumbling aircraft. All simulators are patterned after actual simulators used for training NASA astronauts. The simulators are also tools for demonstrating and experiencing Newton Laws of Motion. Astronaut Simulators have a weight limit of 260 pounds.

#### **IMAX** Theater

Participants will see a movie filmed in IMAX at the Omnimax Theater.





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