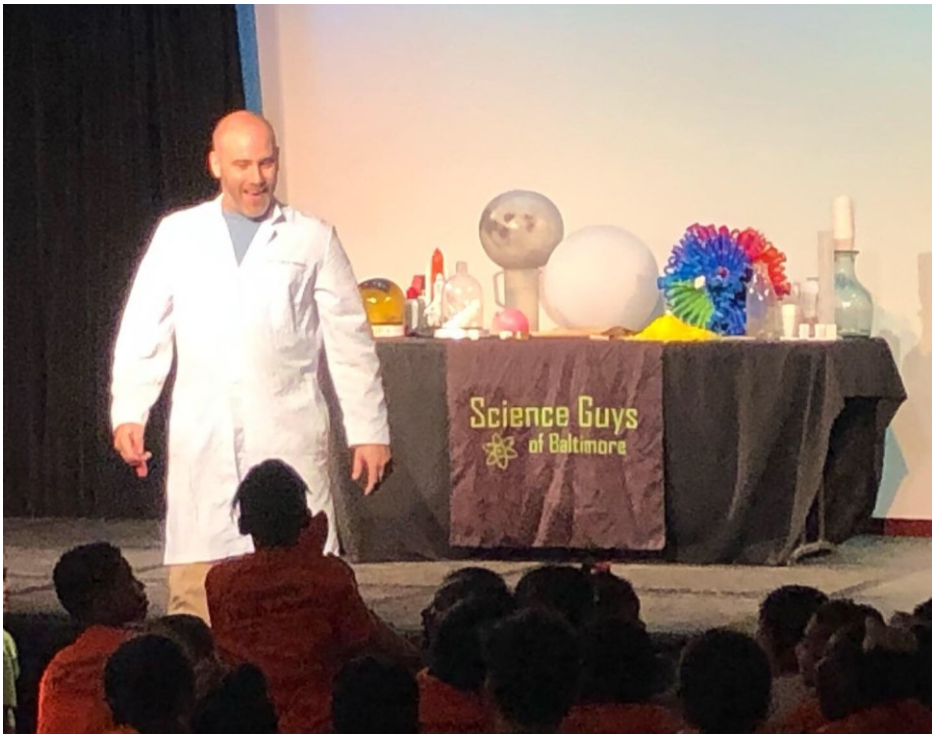
Discovery Theater



Out of this World!

with The Science Guys of Baltimore

Recommended for
Ages 7 to 11 / Grades 2 to 5

A Reproducible Learning Guide for Educators

This guide is designed to help educators prepare for, enjoy, and discuss *Out of This World.*

It contains background, discussion questions and activities appropriate for ages 7 to 11.

Programs Are Made Possible, In Part, By Generous Gifts From:

The Nora Roberts Foundation
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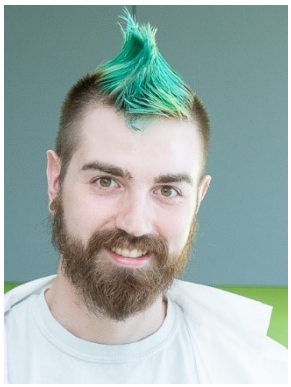
ABOUT THE SHOW AND THE SCIENCE GUYS

Join us for live demonstrations, fun factoids, and space stuff with the **Science Guys of Baltimore**! In this exciting show, we will go on a mission to investigate the physics and chemistry that govern the rotation and orbit of planets, how astronauts live in space, and power the spacecraft that hurtle among the stars.

Keith Trehy started Mr. Bond and the Science Guys in 1999, in Nashville, TN. He was trained as a Chemist, but was a new Dad, and he wanted to be able to combine both of his worlds. So, he brought hands-on, interactive, and engaging science education into schools all over TN. His daughter, **Siena**, went to college in Baltimore at Goucher College. During her time at Goucher, she began doing science birthday parties and other small weekend events, creating her small versions of the Science Guys. It wasn't until her Senior year of college, 2017, that she began the **Science Guys of Baltimore** with **Matt Simms**. Now, the Science Guys offer events year-round, including Summer Camps, Birthday Parties, After-School Clubs, In-School Workshops and Assemblies, and special event Shows.

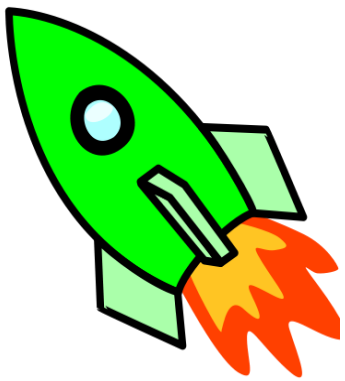
For more info, visit: www.scienceguysofbaltimore.com



MEET YOUR SCIENTIST: TRAVIS HENNINGFIELD, aka TRAVITY

Travis is Baltimore, born and raised! He attended the Friends school of Baltimore for High School, then moved to New York City to attend the Pratt Institute of Art. Travis loves all art, but really enjoys sculpture and found object art. He also worked as a Chef in NYC for 6 years, before moving back to Baltimore and finding his way into the Science Guys. He is their lead teacher for after-school clubs, camps, and birthday parties and has helped develop their Kitchen Chemistry and Science of Art clubs, among many others.

LET'S BLAST OFF INTO SPACE!



For a long time, humans have had their eyes on the stars. Though the interest in Outer Space has been around for centuries, humans did not launch anything into orbit until 1957. The Soviet Union, now Russia, launched the satellite **Sputnik** and set off a series of events known as the **Space Race**. During this time, the United States and the Soviet Union competed with each other to improve their rockets and satellites. Scientists at what is now called **National Air and Space Administration (NASA)** developed new technology and harnessed physics, chemistry, math, engineering and biology to reach beyond Earth's atmosphere.

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SPACE FLIGHT TERMS

Orbit—the curved path that an object in space takes around another object due to gravity

Rotation—an object's spinning motion about its own axis

Axis—an invisible line around which an object rotates

Lift—the force of flight that keeps an object in the air (In an airplane, it is generated by wings)

Drag—the force that acts opposite to the direction of motion

Thrust—the force that propels a flying machine in the direction of motion

Gravity—the force by which a planet draws objects to its center

OBJECT SPOTLIGHT – The Discovery Space Shuttle

Housed at the Stephen F. Udvar-Hazy Center, the Space Shuttle Discovery was one of the busiest Space Shuttles ever. Discovery was the third Space Shuttle orbiter vehicle to fly in space. It entered service in 1984 and retired from spaceflight as the oldest and most accomplished orbiter, the champion of the shuttle fleet. Discovery flew on 39 Earth-orbital missions, spent a total of 365 days in space, and traveled almost 240 million kilometers (150 million miles)--more than the other orbiters. It shuttled 184 men and women into space and back, many of whom flew more than once, for a record-setting total crew count of 251.

Because Discovery flew every kind of mission the Space Shuttle was meant to fly, it embodies well the 30-year history of U.S. human spaceflight from 1981 to 2011. Named for renowned sailing ships of exploration, Discovery is preserved as intact as possible as it last flew in 2011 on the 133rd Space Shuttle mission.

NASA transferred Discovery to the Smithsonian in April 2012 after a delivery flight over the nation's capital.

Take some close looks at the Discovery, what do you notice?
What details can you see when you look through this image gallery?

ASTRONAUT TRAINING

Background

Astronauts need to train physical and mentally to be successful and healthy on their space missions. It takes a lot of work to get ready. Exercises include swimming, aerobics, weight training and agility training. Try out this exercise that tests your dexterity (ability to perform tasks with your hands). Hand-eye coordination is a useful skill for astronauts and training their hands to be able to do long and hard tasks is crucial. When doing work outside of the Space Craft, called Extra-Vehicular Activity (EVA), Astronauts must wear thick gloves to protect themselves from the lack of oxygen.

Materials

-Large Puzzle (no more than 50 pieces) or Cardstock to create puzzle
-Various Gloves (Thin Cloth, Thick Work Gloves)
-Paper and Pencil

Directions

1. Take out your puzzle pieces or create a quick puzzle using some cardstock.
2. Put on one pair of gloves.
3. Complete the puzzle and time yourself. What do you notice about the gloves? Do they help or prevent your work?
4. Take the puzzle apart and scramble the pieces
5. Put on another pair of gloves over top of the first pair. This second pair should be thicker. What do you notice about how the two gloves feel?
6. Complete the puzzle again and time yourself. Was there a difference in time? Was it easier or harder to complete the puzzle with two pair of gloves?

PLANETARY ORBIT SIMULATION

Materials:

-Orange Playdough
-Blue Ball
-Pie Tin

Instructions:

1. Flatten the orange playdough (the Sun) in the center of the pie tin.
2. Place the blue ball (the planet) in the pie tin
3. Try and tilt the pie tin so that the planet orbits around the sun!

Read more about this experiment here: https://www.giftofcuriosity.com/how-planets-orbit-the-sun-a-montessori-inspired-activity/

SMITHSONIAN CONNETIONS

Considering taking a visit to the **National Air and Space Museum** on the National Mall! The museum just opened several new exhibits as it undergoes major construction to bring new learning experiences to Smithsonian visitors. Free, timed-entry passes are currently required.

You can visit the National Air and Space Museum's companion facility—the **Udvar-Hazy Center**, in Chantilly, VA. Opened in 2003, its two huge hangars — the Boeing Aviation Hangar and the James S. McDonnell Space Hangar — display thousands of aviation and space artifacts, including a **Lockheed SR-71 Blackbird**, a **Concorde**, and the **Space Shuttle *Discovery***. The Udvar-Hazy Center is open daily from 10am to 5:30pm. Admission is free and tickets are NOT required.

The **Smithsonian Science Education Center (SSEC)** is the only organization at the Smithsonian Institution that is solely dedicated to formal K-12 Education. By bringing Smithsonian Science into the K-12 classroom, SSEC helps students and teachers unlock the mysteries of the world through science.

Educators, visit their website for **free Smithsonian STEM games and simulations** that your students can play online or download: https://ssec.si.edu/game-center. And then check out their **professional development resources and opportunities** (digital and in person), which cover a variety of topics from delving into student understanding to increasing science content knowledge in educators: https://ssec.si.edu/professional-development.

RELATED RESOURCES

The Little Spacecraft That Could by Joyce Lapin, illustrated by Simona Ceccarelli, 2021. Recommended Grades 1 to 2.

Look to the Stars by Buzz Aldrin, illustrated by Wendell Minor, 2009. Recommended Grades 2 to 3.

Space Place, from NASA. Explore the wonders of earth and space through this activity portal that includes activities and digital interactives.

Moon in Motion, from NASA. Take a closer look at the different phases of the moon and print out your own moon observation journal to complete or look at other activities to learn about the Earths' Moon.

Hubble Space Telescope, from the National Museum of Air and Space. In this Deep Dive, you can learn about the history of the Hubble Space Telescope and why it's important to take good pictures of space.

First Book, is a non-profit that runs a marketplace for free- and reduced-priced educational resources. Visit their website to see eligibility requirements and titles available.

Smithsonian Institution

OUR MISSION: "THE INCREASE AND DIFFUSION OF KNOWLEDGE"

Smithsonian Associates advances the Institution's mission through life-enriching educational and cultural experiences inspired by the Smithsonian's research and collections for DC-region students, families, and adults, and for learning communities nationwide.

Discovery Theater has been presenting DC-area children with live educational performances for almost 40 years. With programs that enrich the Smithsonian experience for nearly 50,000 children annually, Discovery Theater is a gateway to the exhibits, collections, and themes contained in the museums and galleries on the National Mall and beyond. We explore American history and cultures, folk tales from around the world, and exciting, accessible science and math programs in the company of puppeteers, storytellers, dancers, actors, and musicians. Discovery Theater performances unite ideologies, enact themes that reflect the diversity of its audiences, open avenues of self-reflection, and offer an enjoyable means for parents and teachers to demonstrate life's lessons. There's so much to do and explore at the Smithsonian—and Discovery Theater is the ideal place to begin!

Our Location
The S. Dillon Ripley Center, 3rd Sublevel
1100 Jefferson Drive, SW
Washington, DC 20024

Mailing Address
Discovery Theater
P.O. Box 23293
Washington, DC 20026

Email: info@DiscoveryTheater.org
Phone: (202) 633-8700
Fax: (202) 633-1322
Office hours: Mon-Fri, 9:00am - 4:30pm