



Astronaut Theatre
NASA's The Real World
(Grades 6-8)

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Real World: Comets - It's Done With Math (#75)

05 Aug 2011 4:55

NASA engineers are finding new uses for old spacecraft as a way to study comets. Find out how a repurposed spacecraft can return to a comet for a second visit to uncover secrets about the formation of the solar system. Use angular size to see just how big this comet really is!

Real World: Legacy of NASA's Space Shuttle - Because It Flew (#74)

05 Aug 2011 6:14

Use a graph to learn more about the history of NASA's Space Shuttle Program. Find out how mission complexity increased over time, leading to new careers and innovations that will launch us into the next stage of space exploration. See how important the Shuttle was, just because it flew!

Real World: Mercury's MESSENGER Reveals Mysteries (#73)

15 Apr 2011 5:58

How long is a day on Mercury? Why does the planet have a 600 degree range in temperature? MESSENGER, NASA's first mission to Mercury in 30 years, will capture stunning imagery, determine the composition of the surface and measure Mercury's unusual magnetic field.

Real World: Centripetal Force (#72)

2010-11-24 7:51

Join astronauts on-board the International Space Station to learn more about centripetal force and why planets or moons and artificial satellites like the space station stay in orbit. Use math to find out if the artificial gravity in science fiction movies can be a reality.

Real World: Heart Rate and Blood Pressure (#71)

08 Nov 2010 5:47

Learn about the physiological effects reduced gravity environments have on the human body. Use multiplication to calculate cardiac output and find out what effect space travel has on sensory-motor skills, stroke volume and heart rates of the astronauts.

Real World: Longitude and Time Zones (#70)

18 Oct 2010 4:20

What determines how long a second, minute, or hour lasts? Learn about the development of the units of time and how they depend on the rotation of the Earth on its axis. Learn how time zones are related to lines of longitude.

Real World: Robotic Arms (#69)

26 Oct 2010 6:08

Join astronauts on-board the International Space Station as they look at the mass-handling capabilities and unique engineering design of the robotic arm that helps astronauts build, repair, investigate and more in situations too large, too dangerous or too remote for astronauts alone.

Real World: STS-119 Brings More Power to the Space Station (#68)

07 Oct 2010 6:00

Meet two teachers turned astronauts who had important roles in the mission to update the solar arrays on the International Space Station. Find out how STS-119 carried the giant arrays that will allow the station to house a crew of six in the future.

Real World: What Time Is It In Space? (#67)

2010-08-05 5:02

The International Space Station, or ISS, orbits Earth once every 90 minutes. Learn how astronauts keep track of what time it is while on-board the ISS using Universal Time. Learn how students can talk to astronauts on the ISS using amateur radio.

Real World: Calculating Shuttle Launch Windows (#66)

07 Jun 2010 6:48

Learn how NASA engineers use mathematical equations to determine when to launch the space shuttle so it will successfully dock with the International Space Station. Learn about gravity, the orbit plane and other factors that influence launch windows.

Real World: The Silent Airliner (#65)

28 May 2010 7:52

Learn how NASA engineers are working to design safer, faster, quieter aircraft that have less impact on the environment. Discover how to control sonic booms. See how students are encouraged to think and act like engineers through competitions and NASA internships.

Real World: Environmental Control on the International Space Station (#64)

26 May 2010 5:07

Learn how engineers turn perspiration into innovation on the International Space Station so astronauts can live and work comfortably. The Environmental Control and Life Support System, or ECLSS, regulates the environment, including temperature, humidity and breathable air.

Real World: Lunar Power Plant (#63)

28 May 2010 6:29

Learn about one of NASA's new innovations that could supply the huge amount of power needed for exploration. NASA engineers are working with the United States Department of Energy to perfect a nuclear fission system that is efficient and virtually hazard free.

Real World: Using Lab on a Chip Technology to Identify Microorganisms (#62)

26 May 2010 6:31

Listen in to a downlink with the crew on the International Space Station, or ISS, to learn about a recent experiment that helps astronauts monitor their environment. Find out about exponential multiplication and the benefits of new technology to keep the station clean.

Real World: Analog Testing in Extreme Environments (#61)

26 May 2010 7:40

See how NASA uses analog testing to simulate space exploration. Explore extreme environments like the Aquarius underwater laboratory in Key Largo, Florida. Find out how scientists use mathematical equations to determine an astronaut's center of gravity.

Real World: Exploring the Lunar Electric Rover (#60)

27 May 2010 7:00

Join NASA at Desert RATS, or Research and Technology Studies, in Arizona to test drive the Lunar Electric Rover, or LER. Discover how LER's turning radius, ability to move in multiple directions, attached suits, and habitat capabilities optimize safety and exploration efficiency.

Real World: NASA and the Chesapeake Bay (#59)

28 May 2010 8:05

Learn how NASA uses Earth observing satellites to monitor conditions in the Chesapeake Bay over time. Information about pollution, eutrophication, land cover and watershed runoff helps water managers enact policies to improve the health of the Bay.

Real World: TriATHLETE - The Engineering Design Process in Action (#58)

14 May 2010 5:04

See the engineering design process in action at Desert RATS, or Research and Technology Studies, in Arizona. Learn about the next generation of the ATHLETE vehicle. See how the original design changed to allow a split into two robots and the addition of unique tools for exploration.

Real World: Shuttle Safety (#57)

02 Nov 2009 5:10

Learn about the safety measures implemented to protect the shuttle astronauts. Computer modeling and simulation is used to help engineers evaluate the probability of malfunctions in everything from shuttle valves to the thermal protection system.

Real World: Lessons in Heavy Metal (#56)

11 Sep 2009 6:00

Watch as NASA engineers use a special welding technique known as friction-stir welding to bond new composite metals used for the Ares I launch vehicle. See how this process adds strength to the material. Learn to convert degrees Fahrenheit to degrees Celsius.

Real World: History of Winter - Abiotic Conditions (#55)

09 Nov 2010 6:58

Join scientists and teachers as they learn how to measure some of the abiotic conditions of winter. Find out about latent heat, low thermochrons can be used to collect data points and the importance of snow:water equivalents.

Real World: Keeping the International Space Station in Orbit (#54)

09 Nov 2010 5:38

Each day, gravity pulls the International Space Station, or ISS, a little closer to Earth. See how drag causes the ISS to slow down. Learn about the challenges of keeping the ISS in orbit and how NASA counteracts orbital decay.

Real World: Tools for Construction - NASA's Lunar Crane (#53)

11 Sep 2009 5:28

Learn more about the innovative lunar crane being developed by NASA for use in heavy lifting on other worlds. See how composite materials are used to improve the mass: strength ratio and how variable degrees of rotation allow this versatile machine to move.

Real World: Putting Together the Ares I-X (#52)

11 Sep 2009 5:28

NASA centers from across the United States are working together to build the new Ares rocket. Find out how engineers use micrometer tolerances to be sure the parts fit together and how drag coefficients help predict the aerodynamics of the rocket flight test.

Real World: Lightning Protection for Launch Complex 39 (#51)

11 Sep 2009 5:30

See how NASA is using a rolling spheres lightning protection system to expand the cone of protection currently used on Launch Complex 39. Find out how the towers and catenary wires create an easier path for the lightning to get to the ground.

Real World: Self-Healing Materials (#50)

09 Nov 2010 6:08

Learn about the new self-healing materials being developed at NASA. See how these polymers snap back after impact while the structural integrity of the material remains intact. Find out how scientists use math to calculate tensile strength.

Real World: Preparing to Launch Ares I-X (#49)

07 Oct 2010 6:40

Preparing for future space missions, NASA is testing the Ares rockets prototype, Ares I-X. By finding the vehicle's center of gravity, engineers can calculate the exact mass of the vehicle. The forces felt by the astronauts during launch are similar

Real World: Altair (#48)

11 Sep 2009 6:01

In future space missions, Altair will carry crew from Orion to the moon. An engine is being developed that uses deep throttling to control the amount of thrust coming out of the engine.

Real World: Choosing the Right Lunar Excavator (#47)

11 Sep 2009 4:58

See how NASA engineers use the design process to evaluate the best choice for a new lunar excavator. Three different models are tested on location in Hawaii where the soil on Mauna Kea Volcano is similar to that on the moon.

Real World: NASA Inventions - Polyimide Foam (#46)

09 Nov 2010 5:02

Learn about the everyday applications of polyimide foam, one of NASA's commercial inventions of the year. This low-density foam can be used as a fire-resistant insulation for ships or to reduce airplane noise.

Real World: Space Lighting (#45)

09 Nov 2010 5:31

Join NASA engineers as they share the next generation of light emitting diodes, or LED, lighting. Find out how these energy efficient, longer lasting lights recently installed on the International Space Station will benefit us here on Earth.

Real World: Lunar Excavation Blade (#44)

11 Sep 2009 5:03

Learn how NASA engineers use mass efficiency, a measure of size to productivity, to evaluate the excavation blade that could be used on future lunar missions. The blade can help astronauts build landing pads or protective berms.

Real World: Using Lunar Reactors (#43)

11 Sep 2009 5:46

Find out how NASA scientists, like explorers of old, plan to use the natural resources of new worlds to provide life-sustaining materials for the astronauts. During tests in Hawaii, scientists practice extracting oxygen from the lunar-like soil.

Real World: NASA's Lunar Reconnaissance Orbiter Mission (#42)

07 Oct 2010 4:33

Join NASA scientists for a look at the new Lunar Reconnaissance Orbiter, or LRO. Find out about the instruments that will make a comprehensive map of the moon and search for safe landing sites by collecting unprecedented amounts of data.

Real World: Mission to Mercury (#41)

22 Jun 2009 6:15

Find out about NASA's innovative spacecraft that was launched to explore Mercury. Learn about gravity assist and see what scientists have already learned from the preliminary flybys, including evidence of volcanism and plate tectonics.

Real World: Lunar Reconnaissance Orbiter Resources (#40)

21 Aug 2009 7:19

Get a new perspective on moon resources with NASA's Lunar Reconnaissance Orbiter. See how NASA plans to gather data about the unique lunar poles. Scientists will use the light reflected off the surface to identify different minerals on the moon.

Real World: Global Cloud Observation Day (#39)

09 Nov 2010 5:31

Learn about precipitation and how clouds are formed. Find out why scientists study clouds and how you can help NASA collect cloud observation data as part of the Students' Cloud Observation OnLine, or S'COOL, Project.

Real World: Scarab, NASA's Newest Lunar Exploration Rover (#38)

22 Jun 2009 6:49

Find out why engineers are testing NASA's autonomous rover called Scarab. Scarab is equipped with drills for taking lunar soil samples and special wheels designed by Michelin to optimize ground contact pressure.

Real World: Home Improvement - Space Station Style (#37)

26 Oct 2010 4:37

Join astronauts on a spacewalk to fix the solar arrays on the International Space Station, or ISS. Find out about new crew quarters, exercise equipment, a recycling system and an expanded kitchen that finally includes a refrigerator.

Real World: Farewell to the Mars Phoenix Lander (#36)

22 Jun 2009 5:44

See what tools were sent to Mars onboard the Phoenix Lander. Find out why scientists chose a lander to search for water ice on the red planet and what math was involved to slow Phoenix down enough to make a safe landing.

Real World: The Math Involved in ARES (#35)

16 Jul 2009 3:00

Learn about ARES, the unmanned vehicle NASA plans to send to Mars that will fly around the surface collecting data about the red planet. Discover the mathematics used to design ARES.

Real World: Designing Unmanned Aerial Vehicles (#34)

22 Jun 2009 3:00

NASA is using new technology to design Unmanned Aerial Vehicles that collect data and test experiments without putting pilots at risk. Learn about the mathematics involved in designing these airplanes.

Real World: Using Lunar Soil to Make Oxygen (#33)

07 Oct 2010 4:28

Learn how NASA plans to use lunar resources to provide astronauts with water and oxygen. Travel to Hawaii to see tests using a special reactor and a process called hydrogen reduction to release oxygen from the volcanic soil.

Real World: Lunar Landing Test Designs (#32)

27 Jul 2009 6:29

Discover how NASA uses a gantry so astronauts can practice safely landing spacecrafts on the moon. Learn about Orion, the exploration vehicle planned for missions to the moon and Mars.

Real World: Satellites and Solar Eruptions (#31)

17 Aug 2011 5:00

Learn about twin satellites NASA launched to collect data about the sun. Find out why we study the sun and what scientists learn from these missions.

Real World: Mathematics: The Deciding Factor for Lunar Habitats (#30)

09 Nov 2010 6:34

Discover how NASA uses math to design lunar habitats for future missions to the moon. The final configuration will be determined by factors such as weight, dimensions, physical architecture and purpose.

Real World: Testing NASA's New Moon Robot (#29)

22 Jun 2009 5:26

Learn about the mobile robot NASA plans to use for future missions to Mars: the All-Terrain Hex-Limbed Extra-Terrestrial Explorer, or ATHLETE. This one-third scale model helps NASA see just what the robot can do.

Real World: How the Hubble Telescope Is Powered in Space (#28)

19 Jan 2011 7:08

Learn how NASA uses light from the sun to make electricity to keep the Hubble Space Telescope powered in space. Scientists use an equation to balance the power in the solar panels and batteries.

Real World: Monitoring Earth's Energy Budget with CERES (#27)

22 Jun 2009 4:30

Learn how NASA uses a data-collecting sensor, Clouds and Earth's Radiant Energy System, or CERES, to study clouds and make accurate measurements of energy leaving Earth.

Real World: NASA and a Dinosaur Named Dakota (#26)

22 Jun 2009 6:11

Learn how remote sensing is used to help paleontologists identify where fossils may be found. See how the discovery of a hadrosaur has enabled scientists to further their research on dinosaurs.

Real World: Moon Dirt (#25)

22 Jun 2009 5:14

Learn about the special characteristics of moon dirt. Go behind the scenes at the NASA lunar backhoe competition to see who designed the most efficient machine for moon digging.

Real World: Hubble Wide Field Camera 3 (#24)

09 Nov 2010 5:45

The new Wide Field Camera will allow researchers to see further in space than ever before. This camera will replace the current camera on the Hubble Space Telescope and will record objects the human eye cannot see.

Real World: Hubble Repair Mission (#23)

09 Sep 2010 4:27

See how math and Newton's laws help engineers design tools and astronauts successfully train for the next Hubble Space Telescope repair mission.

<p>Real World: Space Shuttle Thermal Protection System (#22) 22 Jun 2009 4:57 Explore the protection system that allows the shuttle to go from frigid temperatures in space to extremely hot temperatures when entering Earth's atmosphere. See how these tiles made of sand protect the astronauts.</p>
<p>Real World: JASON-2 (#21) 02 Nov 2009 4:56 Learn how the satellite, Jason 2, is able to use radar waves to determine the height of sea levels and evaluate the effects of global warming.</p>
<p>Real World: A-Train (#20) 22 Jun 2009 4:26 The A-Train is a group of satellites in orbit collecting atmospheric data. Measuring the same part of Earth's system within minutes of each other, the satellites examine air quality, cloud movement, and more.</p>
<p>Real World: Space Weather (#19) 22 Jun 2009 5:36 This NASA video segment looks at space weather and examines the major ramifications space weather can have on Earth.</p>
<p>Real World: Hubble Thermal Blanket (#18) 09 Nov 2010 5:42 In this NASA video segment, learn how new technology and old-fashioned tailoring keep the Hubble Space Telescope in top shape so it can continue to gather data about the universe.</p>
<p>Real World: Law of Conservation of Energy (#17) 22 Jun 2009 3:58 Learn about the Law of Conservation of Energy and how energy changes from potential energy to kinetic energy. Review the procedure to calculate kinetic energy.</p>
<p>Real World: Work, Force, Energy and Motion (#16) 22 Jun 2009 8:51 Learn how to calculate the force, energy, motion and work of an object using proper units of measurement. Find out how these properties compare with one other. Calculate gravitational potential energy.</p>
<p>Real World: Rectangular Coordinate System (#15) 22 Jun 2009 7:11 Use a number line in a rectangular coordinate system. Identify horizontal and vertical axis lines, quadrants, coordinates, ordered pairs and integers. Example problems help review key concepts.</p>
<p>Real World: Proportionality: Using Ratios and Scales (#14) 22 Jun 2009 2:47 This NASA video segment gives a short review of proportionality. Learn how scale models are created as a cost-efficient way to design and study larger objects. Examples are used to support the presentation.</p>
<p>Real World: Hurricane Hunters (#13) 22 Jun 2009 5:09 This NASA video segment focuses on how scientists use satellites to collect data. These sets of data are then analyzed and used to predict storms.</p>
<p>Real World: How Gravity Affects Molecules (#12) 22 Jun 2009 6:27 See how NASA runs experiments in reduced gravity environments and simulated weightlessness. Learn about polymers and use slopes and ratios to explain a relationship between gravity and convection.</p>
<p>Real World: Scale Models and Ratios (#11) 09 Nov 2010 6:34 This NASA video segment explains scale models, ratios, proportions and how to calculate problems with different units of measurement. Color animations clarify the use of ratios.</p>

Real World: Earth System Science (#10)

22 Jun 2009 5:29

Learn about Earth System Science and how systems are formed when parts interconnecting with other parts make a whole. See how the use of graphs, charts and drawings help communicate thinking.

Real World: Lunar Habitats (#9)

22 Jun 2009 7:24

Learn how inflatable structures may be used as mobile living quarters for astronauts when NASA returns to the moon and then travels to Mars. Explore one inflatable model made of Kevlar.

Real World: Aircraft and Spacecraft Landing Tests (#8)

27 Jul 2009 5:03

Learn how NASA experts use a gantry to test the design of aircraft and spacecraft returning to Earth. See the new design of Orion, the crew exploration vehicle planned for NASA's return to the moon.

Real World: Solar Power on Earth (#7)

01 Feb 2011 3:56

Learn how NASA-inspired technologies produce solar power here on Earth. Go behind the scenes at the "Solar Decathlon," a competition to design a solar-powered house. Explore the benefits of solar energy.

Real World: Solar Power in Space (#6)

26 Oct 2010 2:37

Learn how NASA technologies use alternative energy. Solar sails propel spacecraft through space. The International Space Station, or ISS, catches sunlight to provide electricity and oxygen to the station

Real World: How the Electric Car Gets its Power (#5)

01 Feb 2011 5:59

Learn how engineers and scientists are working to develop more efficient and long-lasting batteries to solar energy. Compare an electric car, which operates on lithium ion batteries, to cars that use fossil fuels.

Real World: Power Tools in Space (#4)

22 Jun 2009 3:33

Learn how household tools have been used in space missions. Find out more about how astronauts use cordless power tools to perform tasks like tightening screws in space and collecting moon rocks.

Real World: Chemistry and Advanced Propulsion Technologies (#3)

22 Jun 2009 5:05

The Variable Specific Impulse Magnetoplasma Rocket, or VASIMR, uses plasma for rocket propulsion. Review the four states of matter and explore the make-up of atoms, electric and magnetic fields and radiation.

Real World: US Standard System of Measurement vs. Metric System (#2)

22 Jun 2009 5:29

Learn about different types of measurement and measurement tools. Compare the US standard system of measurement to the metric system.

Real World: Honeybees (#1)

27 May 2010 5:46

Join NASA scientists and beekeepers in a citizen science project to collect important data about climate change. Learn how honeybees pollinate over 130 crops in the United States each year and what NASA is doing to help study the decline in bee populations.