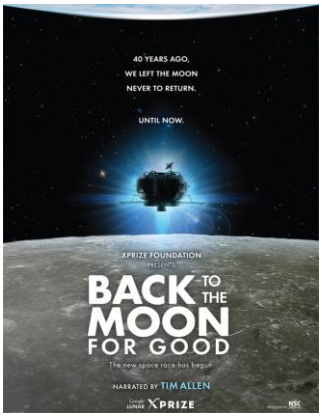
Educator Viewing Guide



Back To The Moon For Good (2013)
25 minutes

Immerse yourself in a race to return to the moon 40-years after the historic Apollo landings. Learn about the moon's resources and discover what humanity's future on the moon might hold. Narrated by Tim Allen, *Back To The Moon For Good* presents the Google Lunar XPRIZE, and the personal stories of competition it inspires. (lunar.xprize.org)

Topics covered:

History of lunar exploration, lunar natural resources, challenges to lunar exploration

Interdisciplinary connections: history, economics, competition/teamwork, natural resources

Key Terms and Concepts:

Atmosphere, Gravity, Impact, Orbit, Poles, Resources, Rover, Space Race

Combine with these KidSpace Activities:

Engineering Lab
Discover the six simple machines and other engineering principles used in designing spacecraft while operating wheels, levers, pulleys, and more.

Launch Lab
Learn the force needed to send rockets into the air. Take aim with our stomp rockets while investigating science concepts: rocket design, force, gravity, altitude, resistance, and more.

PlaySpace!
Science begins with imagination. The space-themed playground offers many opportunities for space-themed play, space-related discoveries, and demonstrations of science concepts: gravity, friction, force, laws of motion, and more.

Learning Resources and Activities:

Create learning units designed around a visit to KidSpace! These web resources and activities are designed to illustrate concepts and ideas presented in the show. Many of these can be adapted to various age groups.

Exploring the Solar System: Mars Rover; NISE Network
This resource contains all downloads needed for participants to learn how scientists and engineers use robotic rovers and other vehicles to explore distant worlds. Includes learning goals and how-to videos (Spanish and English).
http://www.nisenet.org/catalog/exploring-solar-system-mars-rovers-2018

Exploring the Moon Educator Guide; NASA
This educator guide is a comprehensive resource covering lunar geology and regolith, distance to the moon, Apollo landing sites, and life support systems. The activities promote problem solving, communication skills and teamwork for grades 4-12. Includes National Science Standards.
https://www.nasa.gov/audience/foreducators/topnav/materials/listbytype/Exploring.the.Moon.html

Earth and Moon; Space Update, Discovery Dome
This activity helps students recognize the far distances of space compared to the sizes of astronomical objects. Learners measure the true angle of the Moon as seen from Earth. Designed for grades 2-8. Includes learning objectives and math/science standards.
http://www.spaceupdate.com/activities_spaceupdate.php#AS01

Asteroids & Lunar Landscape; Universe Awareness (European Union)
This site contains description, directions, learning objectives, background information, and demonstration pictures for participants to create craters and learn about the landscape of the moon. Participants make observations about projectile impacts using information about size and mass, direction and velocity.
http://www.unawe.org/activity/asteroids_moon_craters/

NASA Space Place: Classroom Activities; NASA
This resource contains several space-related activities for the classroom. Must scroll down to find link to downloadable PDF of activity. Related activities include: *Designing for the Barely Imaginable, The Abracadabra of Engineering, Launch a Frisbee into Orbit!, Put Your Own Spin on Technology,* and more.
https://spaceplace.nasa.gov/classroom-activities/en/

Living on the Moon; Space Kids, New Zealand
This site contains instructions for completing an activity where children explore the idea of building a colony on the moon. Participants design and build their own vision of a future colony while considering factors that influence their designs.
http://www.sciencekids.co.nz/lessonplans/space/livingonthemoon.html

Comprehension Questions:

Help learners process the concepts and ideas presented in the show with these questions.

1. What steps did scientists take to learn more about the moon before they sent an astronaut there?
2. What are some of the challenges to sending more missions to the moon?
3. What problems must scientists solve before they can send more missions to the moon?
4. What are the reasons people believe moon exploration is important to human society.
5. What natural resources does the moon contain that are useful to human society?

Further Research and Discussion

Ask learners to predict if they think one or more of the groups were able to win the competition. Then, allow students to conduct online research to discover the outcome of the competition.

Discussion Questions:

1. What factors do you think affected the ability of teams to complete the challenge?
2. Do you think competition or teamwork would be a better method of meeting this challenge? Why?
3. What outcomes for space exploration came out of this challenge?

This show covers content that addresses Colorado Academic Standard in Science (Physical Science and Earth Systems Science). See Planetarium Show Academic Standard Chart for details by grade.