“Enhancing our youths’ competitive edge through merit badges”
1. Tell the purpose of space exploration and include the following:
   (a) Historical reasons
   (b) Immediate goals in terms of specific knowledge
   (c) Benefits related to Earth resources, technology, and new products
   (d) International relations and cooperation

2. Design a collector’s card, with a picture on the front and information on the back, about your favorite space pioneer. Share your card and discuss four other space pioneers with your counselor.

3. Build, launch, and recover a model rocket.* Make a second launch to accomplish a specific objective. (Rocket must be built to meet the safety code of the National Association of Rocketry. See the “Model Rocketry” chapter of the Space Exploration merit badge pamphlet.) Identify and explain the following rocket parts.
   (a) Body tube
   (b) Engine mount
   (c) Fins
   (d) Igniter
   (e) Launch lug
   (f) Nose cone
   (g) Payload
   (h) Recovery system
   (i) Rocket engine

4. Discuss and demonstrate each of the following:
   (a) The law of action-reaction
   (b) How rocket engines work
   (c) How satellites stay in orbit
   (d) How satellite pictures of Earth and pictures of other planets are made and transmitted

5. Do TWO of the following:
   (a) Discuss with your counselor a robotic space exploration mission and a historic crewed mission. Tell about each mission’s major discoveries, its importance, and what was learned from it about the planets, moons, or regions of space explored.

*If local laws prohibit launching model rockets, do the following activity: Make a model of a NASA rocket. Explain the functions of the parts. Give the history of the rocket.
(b) Using magazine photographs, news clippings, and electronic articles (such as from the internet), make a scrapbook about a current planetary mission.

(c) Design a robotic mission to another planet, moon, comet, or asteroid that will return samples of its surface to Earth. Name the planet, moon, comet, or asteroid your spacecraft will visit. Show how your design will cope with the conditions of the environments of the planet, moon, comet, or asteroid.

6. Describe the purpose, operation, and components of ONE of the following:
   (a) Space shuttle or any other crewed orbital vehicle, whether government-owned (U.S. or foreign) or commercial
   (b) International Space Station

7. Design an inhabited base located within our solar system, such as Titan, asteroids, or other locations that humans might want to explore in person. Make drawings or a model of your base. In your design, consider and plan for the following:
   (a) Source of energy
   (b) How it will be constructed
   (c) Life-support system
   (d) Purpose and function

8. Discuss with your counselor two possible careers in space exploration that interest you. Find out the qualifications, education, and preparation required and discuss the major responsibilities of those positions.
Space Exploration Resources

Information about space exploration changes constantly. Each new mission makes discoveries and shows that some of our old ideas were incorrect. When you look up information about space and humankind's efforts to explore it, always try to find a recently published book or a dependable website.

Scouting Literature
Astronomy, Aviation, Chemistry, Digital Technology, Electricity, Electronics, Engineering, Geology, Inventing, Nuclear Science, Photography, Programming, Radio, and Robotics merit badge pamphlets

Visit the Boy Scouts of America’s official retail website at http://www.scoutstuff.org for a complete listing of all merit badge pamphlets and other helpful Scouting materials and supplies.

Books


Organizations and Websites

American Institute of Aeronautics and Astronautics
Telephone: 800-639-2422
Website: http://www.aiaa.org

European Space Agency
Website: http://www.esa.int

“Europe’s gateway to space” has 19 member countries, including France, Germany, and the United Kingdom.

Galileo Legacy Site
Website: http://solarsystem.nasa.gov/galileo

Goddard Space Flight Center
Website: http://www.nasa.gov/centers/goddard

The center is “home to the nation’s largest organization of combined scientists, engineers, and technologists that build spacecraft, instruments, and new technology to study Earth, the Sun, our solar system, and the universe.”

NASA Image Galleries
Website: https://www.nasa.gov/multimedia/imagegallery/

The NASA image galleries boast a collection of more than a thousand images “of significant historical interest.”

Jet Propulsion Laboratory
4800 Oak Grove Drive
Pasadena, CA 91109
Telephone: 818-354-4321
Website: http://www.jpl.nasa.gov

The JPL is considered NASA’s leading “center for robotic exploration of the solar system.”

Johnson Space Center
Space Center Houston
1601 NASA Parkway
Houston, TX 77058
Telephone: 281-244-2100
JSC website: http://www.nasa.gov/centers/johnson/home/index.html
SCH website: http://www.spacecenter.org

Kennedy Space Center
Telephone: 321-867-5000
Website: http://www.nasa.gov/centers/kennedy/home/index.html

Marshall Space Flight Center
Website: http://www.nasa.gov/centers/marshall/home/index.html

National Aeronautics and Space Administration
Telephone: 202-358-0001
Website: http://www.nasa.gov

NASA’s website has a bounty of information about space exploration for students of all ages.

Opportunities at NASA:
http://nasajobs.nasa.gov

Astronaut Selection Program:
http://astronauts.nasa.gov

SkyWatch applet to track satellite sightings including the International Space Station: https://spotthestation.nasa.gov/sightings/

Spinoffs: http://spinoff.nasa.gov

National Association of Rocketry
Toll-free telephone: 800-262-4872
Website: http://www.nar.org

The world’s oldest and largest sport rocketry organization. Visit the website to find the club nearest you.

National Space Society
Telephone: 202-429-1600
Website: http://www.nss.org
Space Exploration Resources

Planetary Society
Telephone: 626-793-5100
Website: http://www.planetary.org

Smithsonian National Air and Space Museum
Independence Avenue at Sixth Street, SW
Washington, DC 20560
Telephone: 202-633-1000
Website: http://airandspace.si.edu

Technology Student Association
Toll-free telephone: 888-860-9010
Website: http://www.tsaweb.org

TSA provides programs for middle and high school students interested in the technology.

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