



**SPACE EXPLORATION MERIT BADGE WORKBOOK**

This Scoutmaster Bucky Merit Badge Workbook is based off the *2020 Scouts BSA Requirements*.

Consider also using the Space Exploration merit badge class preparation page for clarification and expectations when participating in a Scoutmaster Bucky merit badge opportunity (online or in-person).

<https://scoutmasterbucky.com/merit-badges/space-exploration/>

Scout's Name:

**REQUIREMENT 1:** Tell the purpose of space exploration and include the following:

**REQUIREMENT 1A:** Historical reasons

**REQUIREMENT 1B:** Immediate goals in terms of specific knowledge



**REQUIREMENT 1C:** Benefits related to Earth resources, technology, and new products

**REQUIREMENT 1D:** International relations and cooperation

**REQUIREMENT 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.

**REQUIREMENT 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:



**REQUIREMENT 3A: Body tube**

**REQUIREMENT 3B: Engine mount**

**REQUIREMENT 3C: Fins**

**REQUIREMENT 3D: Igniter**



**REQUIREMENT 3E: Launch lug**

**REQUIREMENT 3F: Nose cone**

**REQUIREMENT 3G: Payload**

**REQUIREMENT 3H: Recovery system**



**REQUIREMENT 3I: Rocket engine**

*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.*

**REQUIREMENT 4: Discuss and demonstrate each of the following:**

**REQUIREMENT 4A: The law of action-reaction**

**REQUIREMENT 4B: How rocket engines work**



**REQUIREMENT 4C:** How satellites stay in orbit

**REQUIREMENT 4D:** How satellite pictures of Earth and pictures of other planets are made and transmitted

**REQUIREMENT 5:** Do TWO of the following:

**REQUIREMENT 5A:** 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.



**REQUIREMENT 5B:** Using magazine photographs, news clippings, and electronic articles (such as from the Internet), make a scrapbook about a current planetary mission.

**REQUIREMENT 5C:** 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.

**REQUIREMENT 6:** Describe the purpose, operation, and components of ONE of the following:

**REQUIREMENT 6A:** Space shuttle or any other crewed orbital vehicle, whether government-owned (U.S. or foreign) or commercial



**REQUIREMENT 6B: International Space Station**

**REQUIREMENT 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:

**REQUIREMENT 7A: Source of energy**

**REQUIREMENT 7B: How it will be constructed**





**REQUIREMENT 7C: Life-support system**

**REQUIREMENT 7D: Purpose and function**

**REQUIREMENT 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.