



## Space Exploration Merit Badge Workbook

# SCOUTMASTER BUCKY

Scouts participating in a Scoutmaster Bucky merit badge opportunity, whether online or in person, should consider using the Space Exploration merit badge pamphlet for discovery and knowledge, along with the class preparation pages for clarifications, insights, and expectations.

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

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

### **REQUIREMENT 1:** Tell the purpose of space exploration

Notes:

### **REQUIREMENT 1a:** Tell about the historical reasons for space exploration.

Notes:



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**REQUIREMENT 1b:** Tell about the immediate goals in terms of specific knowledge as it relates to space exploration.

Notes:

**REQUIREMENT 1c:** Tell how space exploration benefits Earth resources.

Notes:

**REQUIREMENT 1c:** Tell how space exploration benefits technology.

Notes:



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**REQUIREMENT 1c:** Tell how space exploration benefits new products.

Notes:

**REQUIREMENT 1d:** Tell how space exploration influences and benefits international relations and cooperation.

Notes:

**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 with your counselor.

Don't forget to bring your collector's card to share with the merit badge counselor

**This requirement must be reviewed with your merit badge counselor.**

**BE PREPARED!**



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**REQUIREMENT 2:** Discuss four other space pioneers with your counselor.

Space Pioneer #1:

Space Pioneer #2:

Space Pioneer #3:

Space Pioneer #4:



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### REQUIREMENT 3:

Build, launch, and recover a model rocket. Make a second launch to accomplish a specific objective. Identify and explain the following rocket parts:

- |                 |               |                    |
|-----------------|---------------|--------------------|
| a. Body Tube    | d. Igniter    | g. Payload         |
| b. Engine mount | e. Launch Lug | h. Recovery System |
| c. Fins         | f. Nose Cone  | i. Rocket Engine   |

**Alternative requirement:** 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.

**SAFETY NOTE: 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.**

You will need to be able to share your work with your counselor.

Scoutmaster Bucky classes include a simple model kit that Scouts will have time to assemble, and launch.

**BE AWARE:** Environmental factors (i.e., bad weather) may prohibit launching during the class.

Scouts may choose to purchase and build their own rocket ahead of time if they choose. You will however need to make sure you have the proper engines for multiple launches. If you choose to launch prior to the class, be sure to get a video of you and your launches to share with the counselor.

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Notes:



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**REQUIREMENT 3a:** Identify and explain the following rocket part: Body Tube.

Notes:

**REQUIREMENT 3b:** Identify and explain the following rocket part: Engine Mount.

Notes:

**REQUIREMENT 3c:** Identify and explain the following rocket part: Fins.

Notes:

**REQUIREMENT 3d:** Identify and explain the following rocket part: Igniter.

Notes:



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**REQUIREMENT 3e:** Identify and explain the following rocket part: Launch Lug.

Notes:

**REQUIREMENT 3f:** Identify and explain the following rocket part: Nose Cone.

Notes:

**REQUIREMENT 3g:** Identify and explain the following rocket part: Payload.

Notes:

**REQUIREMENT 3h:** Identify and explain the following rocket part: Recovery System.

Notes:



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**REQUIREMENT 3i:** Identify and explain the following rocket part: Rocket Engine.

Notes:

**REQUIREMENT 4a:** Discuss and demonstrate the law of action-reaction.

Notes:

**REQUIREMENT 4b:** Discuss and demonstrate how rocket engines work.

Notes:





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**REQUIREMENT 4c:** Discuss and demonstrate how satellites stay in orbit.

Notes:

**REQUIREMENT 4d:** Discuss and demonstrate how satellite pictures of Earth and pictures of other planets are made and transmitted.

Notes:



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**DO TWO OF THE FOLLOWING (5A, 5B, or 5C) FOR REQUIREMENT 5**

**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.

ROBOTIC SPACE EXPLORATION MISSION:

Robotic Space Exploration Mission Name, Date, Duration, etc.:

Major Discoveries:

Importance:

What was learned:



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### HISTORIC CREWED SPACE EXPLORATION MISSION:

Historic Crewed Space Exploration Mission Name, Date, Duration, etc.:

Major Discoveries:

Importance:

What was learned:



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**REQUIREMENT 5b:** Using articles from the internet, photographs and text, create a blog, website, or slide show about a current planetary mission or use magazine photographs, news clippings, and articles from the internet to make a scrapbook about a current planetary mission.

Don't forget to bring your scrapbook with you to share with the merit badge counselor

**This requirement must be reviewed with your merit badge counselor.**

**BE PREPARED!**

**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.

Planet, Moon, Comet, or Asteroid Name or Designator to be Visited:

**REQUIREMENT 5c:** Show how your design will cope with the conditions of the environments of the planet, moon, comet, or asteroid.

Notes:



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

Selected Space Vehicle:

Purpose:

Operation:

Components:



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**REQUIREMENT 6b:** Describe the purpose, operation, and components of the International Space Station.

Purpose:

Operation:

Components:



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### 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:

- a. Source of energy
- b. How it will be constructed
- c. Life-support system
- d. Purpose and function

Scoutmaster Bucky Space Exploration Merit Badge classes allot **SOME** time for work on this requirement if needed, however Scouts **MUST** do a fair amount of preparation work prior to the class to find the greatest success.

**This requirement must be reviewed with your merit badge counselor.**

**BE PREPARED!**

Notes:



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**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.

CAREER OPPORTUNITY #1:

Selected Career Opportunity:

Qualification Requirements:

Education Requirements:

Preparation Requirements:

Major Responsibilities for this Career Position:





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### CAREER OPPORTUNITY #2:

Selected Career Opportunity:

Qualification Requirements:

Education Requirements:

Preparation Requirements:

Major Responsibilities for this Career Position: