



# Space Exploration

## Merit Badge Workbook

This workbook can help you but you still need to read the merit badge pamphlet.

The work space provided for each requirement should be used by the Scout to make notes for discussing the item with his counselor, not for providing the full and complete answers. Each Scout must do each requirement.

No one may add or subtract from the official requirements found in **Boy Scout Requirements** (Pub. 33216 – SKU 34765).

The requirements were last issued or revised in 2005 • This workbook was updated in January 2014.

Scout's Name: \_\_\_\_\_ Unit: \_\_\_\_\_

Counselor's Name: \_\_\_\_\_ Counselor's Phone No.: \_\_\_\_\_

**\*\*\*Complete all required Fields before the Event. Requirements 2, 3(Rocket Build/Launch/Recover), 5B and 8 Do at Home. This must be completed before the event and signed off by your Scout Master. Scout must bring this completed sheet and Blue Card to Event for Merit Badge Credit.\*\*\***

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. \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

- 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. **(do at Home)**

**Your Card** \_\_\_\_\_

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

4 \_\_\_\_\_

- 3. Build, launch, and recover a model rocket. **(Do at Home)**
- Make a second launch to accomplish a specific objective\*.

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 an unmanned space exploration mission and an early manned mission. Tell about each mission's major discoveries, its importance, and what we learned from it about the planets, moons, or regions of space explored. \_\_\_\_\_

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

- b. Using magazine photographs, news clippings, and electronic articles (such as from the Internet), make a scrapbook about a current planetary mission. **(Do at Home)**

- c. Design an unmanned mission to another planet or moon that will return samples of its surface to Earth. \_\_\_\_\_

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

Name the planet or moon your spacecraft will visit. \_\_\_\_\_

Show how your design will cope with the conditions of the planet's or moon's environment. \_\_\_\_\_

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

---

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

- a. Space shuttle
- b. International Space Station

Purpose \_\_\_\_\_

\_\_\_\_\_

Operation \_\_\_\_\_

\_\_\_\_\_

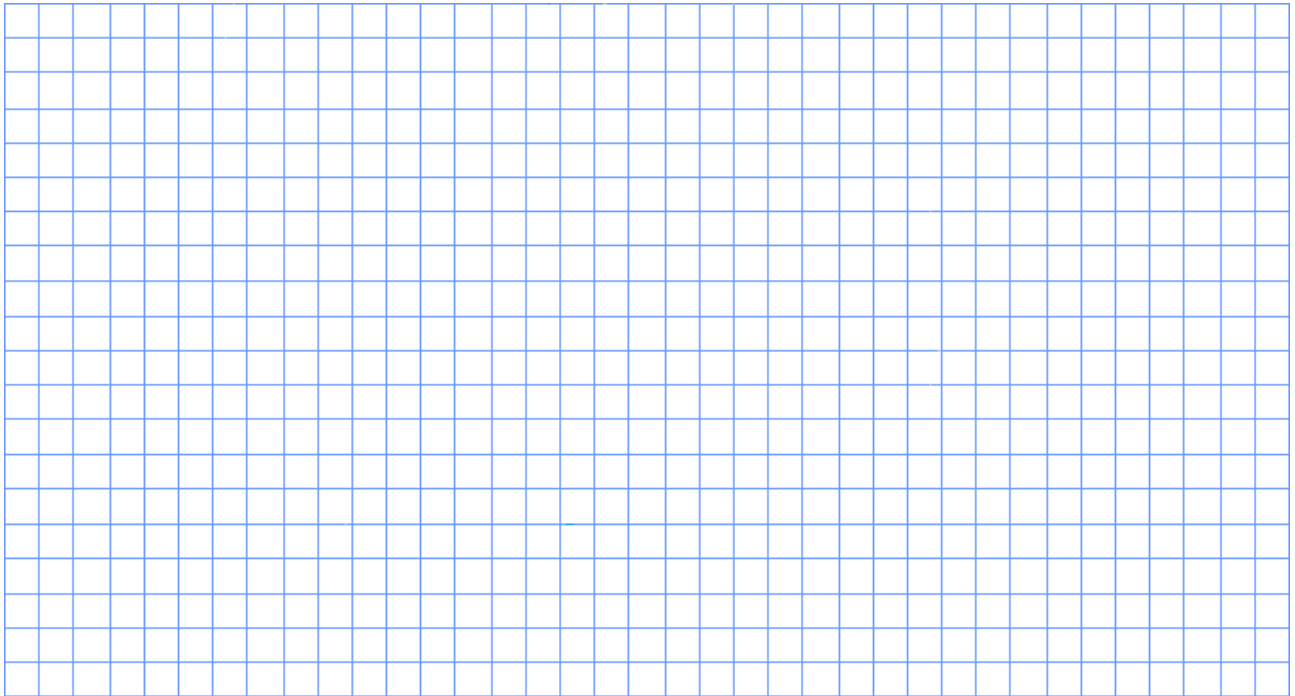
Components \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

7. Design an inhabited base located on the Moon or Mars. (Done at Event)

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. **(Do at Home)**

Career 1 \_\_\_\_\_

Qualifications \_\_\_\_\_

Education \_\_\_\_\_

Preparation \_\_\_\_\_

Major responsibilities \_\_\_\_\_

Career 2 \_\_\_\_\_

Qualifications \_\_\_\_\_

Education \_\_\_\_\_

Preparation \_\_\_\_\_

Major responsibilities \_\_\_\_\_

## Important excerpts from the [‘Guide To Advancement’](#), No. 33088:

Effective January 1, 2012, the ‘Guide to Advancement’ (which replaced the publication ‘Advancement Committee Policies and Procedures’) is now the official Boy Scouts of America source on advancement policies and procedures.

- **[ Inside front cover, and 5.0.1.4 ] — Unauthorized Changes to Advancement Program**  
**No council, committee, district, unit, or individual has the authority to add to, or subtract from, advancement requirements.**  
(There are limited exceptions relating only to youth members with disabilities. For details see section 10, “Advancement for Members With Special Needs”.)
- **[ Inside front cover, and 7.0.1.1 ] — The [‘Guide to Safe Scouting’](#) Applies**  
Policies and procedures outlined in the ‘Guide to Safe Scouting’, No. 34416, apply to all BSA activities, including those related to advancement and Eagle Scout service projects. [Note: Always reference the online version, which is updated quarterly.]
- **[ 7.0.3.1 ] — The Buddy System and Certifying Completion**  
Youth members must not meet one-on-one with adults. Sessions with counselors must take place where others can view the interaction, or the Scout must have a buddy: a friend, parent, guardian, brother, sister, or other relative —or better yet, another Scout working on the same badge— along with him attending the session. When the Scout meets with the counselor, he should bring any required projects. If these cannot be transported, he should present evidence, such as photographs or adult certification. His unit leader, for example, might state that a satisfactory bridge or tower has been built for the Pioneering merit badge, or that meals were prepared for Cooking. If there are questions that requirements were met, a counselor may confirm with adults involved. Once satisfied, the counselor signs the blue card using the date upon which the Scout completed the requirements, or in the case of partials, initials the individual requirements passed.
- **[ 7.0.3.2 ] — Group Instruction**  
It is acceptable—and sometimes desirable—for merit badges to be taught in group settings. This often occurs at camp and merit badge midways or similar events. Interactive group discussions can support learning. The method can also be attractive to “guest experts” assisting registered and approved counselors. Slide shows, skits, demonstrations, panels, and various other techniques can also be employed, but as any teacher can attest, not everyone will learn all the material.

There must be attention to each individual’s projects and his fulfillment of *all* requirements. We must know that every Scout — actually and *personally*— completed them. If, for example, a requirement uses words like “show,” “demonstrate,” or “discuss,” then every Scout must do that. It is unacceptable to award badges on the basis of sitting in classrooms *watching* demonstrations, or remaining silent during discussions. Because of the importance of individual attention in the merit badge plan, group instruction should be limited to those scenarios where the benefits are compelling.

- **[ 7.0.3.3 ] — Partial Completions**  
Scouts need not pass all requirements with one counselor. The Application for Merit Badge has a place to record what has been finished — a “partial.” In the center section on the reverse of the blue card, the counselor initials for each requirement passed. In the case of a partial completion, he or she does not retain the counselor’s portion of the card. A subsequent counselor may choose not to accept partial work, but this should be rare. A Scout, if he believes he is being treated unfairly, may work with his Scoutmaster to find another counselor. An example for the use of a signed partial would be to take it to camp as proof of prerequisites. Partial completions have no expiration except the 18th birthday.