



# Space Exploration

## Merit Badge Workbook

This workbook can help you but you still need to read the merit badge pamphlet (book). No one can add or subtract from the Boy Scout Requirements #33215. Merit Badge Workbooks and much more are below: [Online Resources](#).

Workbook developer: [craig@craiglincoln.com](mailto:craig@craiglincoln.com). Requirements revised: 2005, Workbook updated: April 2008.

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

Counselor's Name: \_\_\_\_\_ Counselor's Ph #: \_\_\_\_\_

### 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.

1 \_\_\_\_\_

2 \_\_\_\_\_

3 \_\_\_\_\_

4 \_\_\_\_\_

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.) Identify and explain the following rocket parts. \* 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.

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.** \_\_\_\_\_

**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. 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.**

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

**Find out the qualifications, education, and preparation required** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**and discuss the major responsibilities of those positions.** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

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

**Find out the qualifications, education, and preparation required** \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

**and discuss the major responsibilities of those positions.** \_\_\_\_\_

\_\_\_\_\_  
\_\_\_\_\_

**Online Resources** *(Use any Internet resource with caution and only with your parent's or guardian's permission.)*

**Boy Scouts of America:** ▶ [scouting.org](http://scouting.org) ▶ [Guide to Safe Scouting](#) ▶ [Age-Appropriate Guidelines](#) ▶ [Safe Swim Defense](#)  
▶ [Scout](#) ▶ [Tenderfoot](#) ▶ [Second Class](#) ▶ [First Class](#) ▶ [Rank Videos](#) ▶ [Safety Afloat](#)

**Boy Scout Merit Badge Workbooks:** [usscouts.org](http://usscouts.org) -or- [meritbadge.org](http://meritbadge.org)    **Merit Badge Books:** [www.scoutstuff.org](http://www.scoutstuff.org)

Space Exploration: [http://en.wikipedia.org/wiki/Space\\_exploration](http://en.wikipedia.org/wiki/Space_exploration)

Satellites: <http://en.wikipedia.org/wiki/Satellite>

Satellite Imagery: [http://en.wikipedia.org/wiki/Satellite\\_imagery](http://en.wikipedia.org/wiki/Satellite_imagery)

Model Rockets: [http://en.wikipedia.org/wiki/Model\\_rocket](http://en.wikipedia.org/wiki/Model_rocket)

International Space Station: [http://en.wikipedia.org/wiki/International\\_Space\\_Station](http://en.wikipedia.org/wiki/International_Space_Station)

Space Shuttle: [http://en.wikipedia.org/wiki/Space\\_Shuttle](http://en.wikipedia.org/wiki/Space_Shuttle)

Unmanned Space Missions: [http://en.wikipedia.org/wiki/Wikipedia:WikiProject\\_Unmanned\\_space\\_missions](http://en.wikipedia.org/wiki/Wikipedia:WikiProject_Unmanned_space_missions)

How Rocket Engines Work: [http://en.wikipedia.org/wiki/Rocket\\_engine](http://en.wikipedia.org/wiki/Rocket_engine)