



# 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: November 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 \_\_\_\_\_

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b. Immediate goals in terms of specific knowledge \_\_\_\_\_

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c. Benefits related to Earth resources, \_\_\_\_\_

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technology, and new products. \_\_\_\_\_

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### 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 \_\_\_\_\_

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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 \_\_\_\_\_

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**b. How rocket engines work** \_\_\_\_\_

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**c. How satellites stay in orbit** \_\_\_\_\_

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**d. How satellite pictures of Earth and pictures of other planets are made and transmitted** \_\_\_\_\_

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

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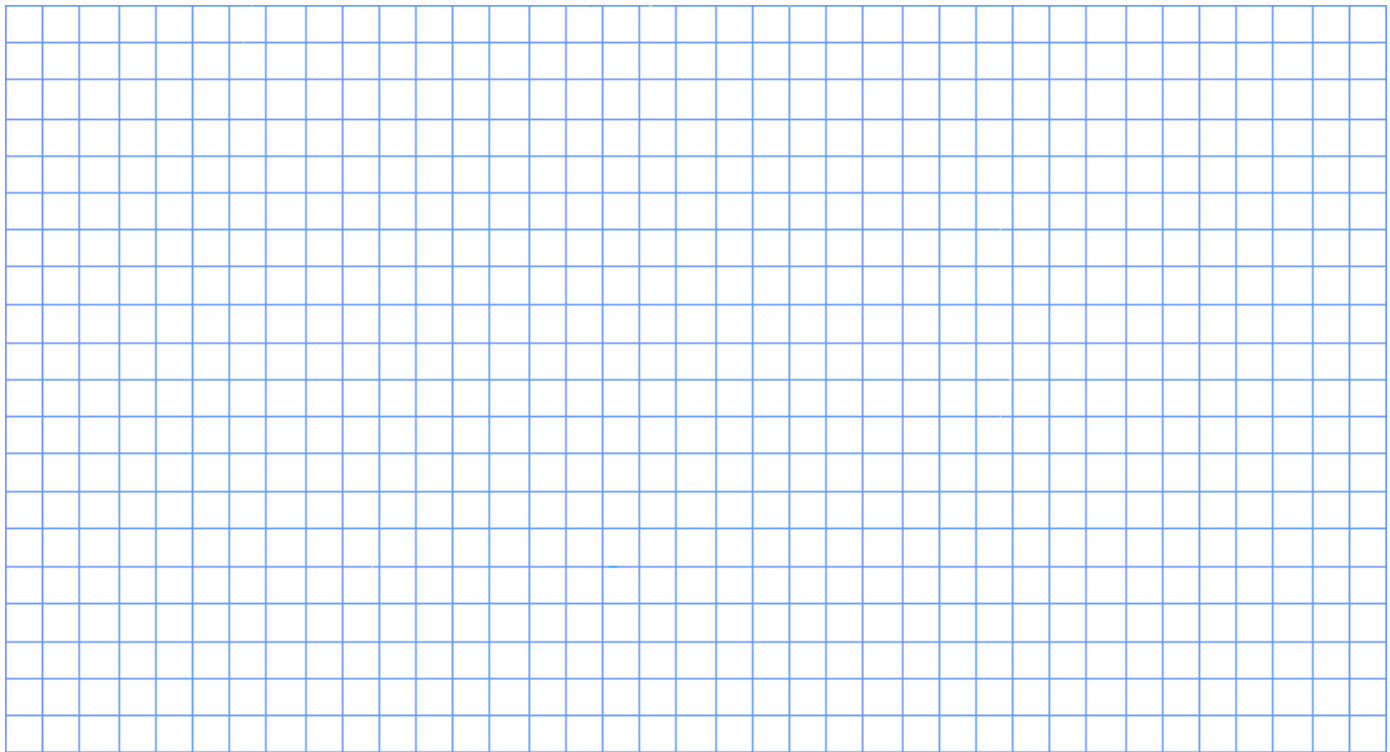
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b. Using magazine photographs, news clippings, and electronic articles (such as from the Internet), make a scrapbook about a current planetary mission. \_\_\_\_\_

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

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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)

### **Requirement Resources**

- 1: Space Exploration: [http://en.wikipedia.org/wiki/Space\\_exploration](http://en.wikipedia.org/wiki/Space_exploration)
- 2: Historic figures in space exploration: [http://meritbadge.org/wiki/index.php/Historic\\_figures\\_in\\_space\\_exploration](http://meritbadge.org/wiki/index.php/Historic_figures_in_space_exploration)
- 3: Model Rockets: [http://en.wikipedia.org/wiki/Model\\_rocket](http://en.wikipedia.org/wiki/Model_rocket)
- 4a: NASA – How Things Work: <http://www-ksl.stanford.edu/htw/htw-overview.html>
- 4b: How Rocket Engines Work: [http://en.wikipedia.org/wiki/Rocket\\_engine](http://en.wikipedia.org/wiki/Rocket_engine)
- 4c: Satellites: <http://en.wikipedia.org/wiki/Satellite>
- 4d: Satellite Imagery: [http://en.wikipedia.org/wiki/Satellite\\_imagery](http://en.wikipedia.org/wiki/Satellite_imagery)
- 5: Unmanned Space Missions: [http://en.wikipedia.org/wiki/Wikipedia:WikiProject\\_Unmanned\\_space\\_missions](http://en.wikipedia.org/wiki/Wikipedia:WikiProject_Unmanned_space_missions)  
 Early & Current Manned Space Missions: [http://en.wikipedia.org/wiki/Human\\_spaceflight](http://en.wikipedia.org/wiki/Human_spaceflight)
- 6a: Space Shuttle: [http://en.wikipedia.org/wiki/Space\\_Shuttle](http://en.wikipedia.org/wiki/Space_Shuttle)
- 6b: International Space Station: [http://en.wikipedia.org/wiki/International\\_Space\\_Station](http://en.wikipedia.org/wiki/International_Space_Station)
- 7: Moon Base Station: [http://en.wikipedia.org/wiki/Colonization\\_of\\_the\\_Moon](http://en.wikipedia.org/wiki/Colonization_of_the_Moon)  
 Mars Base Station: [http://en.wikipedia.org/wiki/Colonization\\_of\\_Mars](http://en.wikipedia.org/wiki/Colonization_of_Mars)
- 8: Space Careers: <http://www.space-careers.com/> [http://www.faa.gov/education\\_research/education/careers/](http://www.faa.gov/education_research/education/careers/)  
 Jobs at NASA: <http://www.jsc.nasa.gov/people/jobs.html> <http://www.nasajobs.nasa.gov/>

### **General Resources:**

Smithsonian National Air and Space Museum: <http://www.nasm.si.edu>

NASA: <http://www.nasa.gov>

European Space Agency: <http://www.esa.int>

Goddard Space Flight Center: <http://www.gsfc.nasa.gov>

Jet Propulsion Laboratory: <http://www.jpl.nasa.gov>

Space Center: <http://www.spacecenter.org>

Marshall Space Flight Center: <http://www.msfc.nasa.gov>

National Association of Rocketry: <http://www.nar.org>

Planetary Society: <http://www.planetary.org>

Am. Inst. of Aeronautics and Astronautics: <http://www.aiaa.org>

Galileo Scale Model: <http://www.jpl.nasa.gov/galileo/model.html>

Great Images in NASA: <http://grin.hq.nasa.gov>

Johnson Space Center: <http://www.jsc.nasa.gov>

Kennedy Space Center: <http://www.ksc.nasa.gov>

Junior Engineering Technical Society: <http://www.jets.org>

National Space Society: <http://www.nss.org>