



# 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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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. \_\_\_\_\_

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

a. Space shuttle

b. International Space Station

Purpose \_\_\_\_\_

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Operation \_\_\_\_\_

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Components \_\_\_\_\_

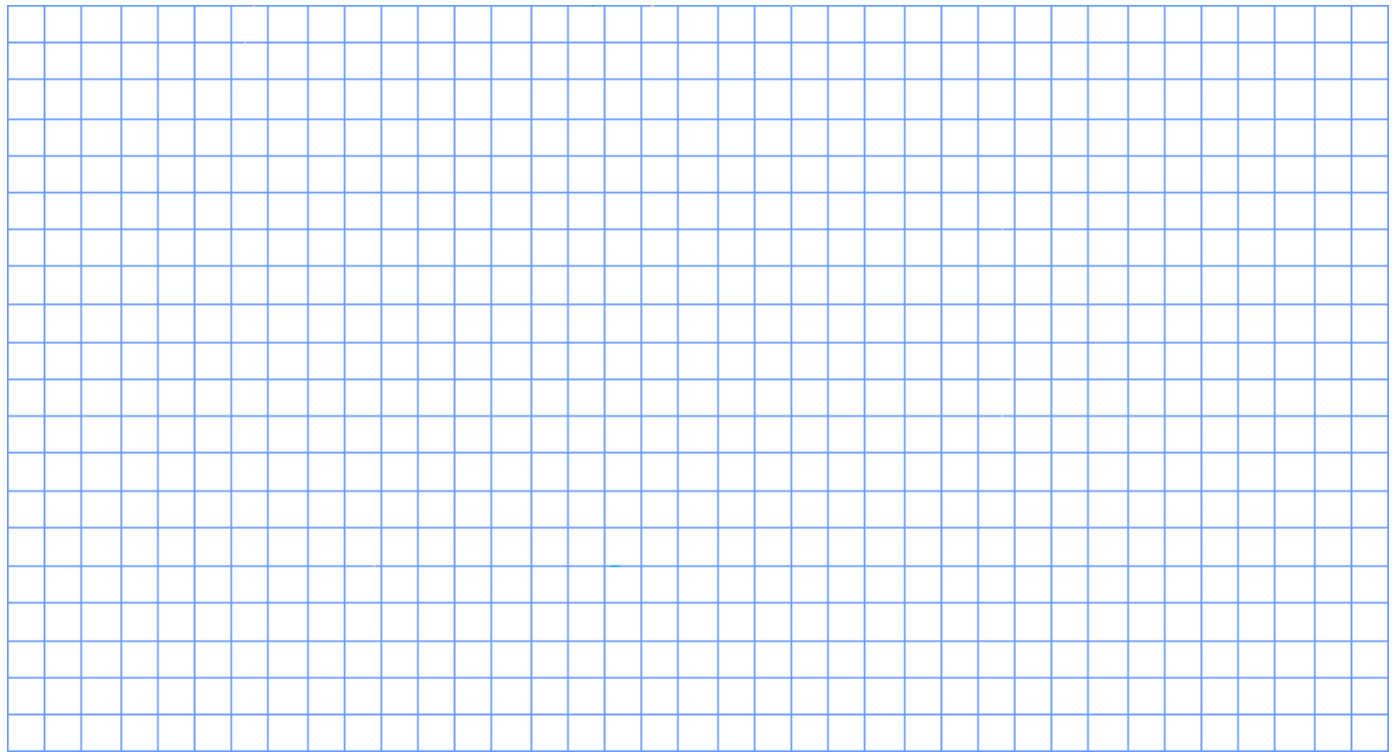
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7. Design an inhabited base located on the Moon or Mars. \_\_\_\_\_

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: [BSA Troop 780](#) -or- [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>