<http://www.USScouts.Org> • <http://www.MeritBadge.Org>

Please submit errors, omissions, comments or suggestions about this **workbook** to: [Workbooks@USScouts.Org](mailto:Workbooks@usscouts.org?subject=Merit%20Badge%20Workbooks)

Comments or suggestions for changes to the **requirements** for the **merit badge** should be sent to: [Merit.Badge@Scouting.Org](mailto:merit.badge@scouting.org)

***\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

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.

|  |
| --- |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |

d. International relations and cooperation.

|  |
| --- |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |

⬜ 2. Design a collector’s card, with a picture on the front and information on the back, about your favorite space pioneer.

|  |  |
| --- | --- |
| Front | Back |
|  |  |

Share your card and discuss four other space pioneers with your counselor.

|  |  |
| --- | --- |
| Your Card |  |
|  |
|  |
|  |
|  |
|  |
| 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 of the *Space Exploration* merit badge pamphlet.)

⬜ *\* 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.*

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 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.

|  |
| --- |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |

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

⬜ c. Design a robotic 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 or any other crewed orbital vehicle, whether government owned (U.S. or foreign) or commercial

⬜ b. International Space Station

|  |  |
| --- | --- |
| Purpose |  |
|  |
|  |
|  |
|  |
|  |
| Operation |  |
|  |
|  |
|  |
|  |
|  |
| Components |  |
|  |
|  |
|  |
|  |
|  |

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 |  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |

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 1 |  |
| Qualifications |  |
|  |
|  |
|  |
|  |
| Education |  |
|  |
|  |
|  |
|  |
| Preparation |  |
|  |
|  |
|  |
|  |
|  |
|  |
| Major responsibilities |  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |

|  |  |
| --- | --- |
| Career 2 |  |
| Qualifications |  |
|  |
|  |
|  |
|  |
| Education |  |
|  |
|  |
|  |
|  |
| Preparation |  |
|  |
|  |
|  |
|  |
|  |
|  |
| Major responsibilities |  |
|  |
|  |
|  |
|  |
|  |
|  |
|  |

**When working on merit badges, Scouts and Scouters should be aware of some vital information in the current edition of the *Guide to Advancement* (BSA publication 33088).Important excerpts from that publication can be downloaded from** [**http://usscouts.org/advance/docs/GTA-Excerpts-meritbadges.pdf**](http://usscouts.org/advance/docs/GTA-Excerpts-meritbadges.pdf)**.**

**You can download a complete copy of the *Guide to Advancement* from** [**http://www.scouting.org/filestore/pdf/33088.pdf**](http://www.scouting.org/filestore/pdf/33088.pdf)**.**