SPACE EXPLORATION

Merit Badge Requirements

1) Tell the purpose of space exploration including:

A) Historical reason.
B) Immediate goals in terms of specific knowledge.
C) Benefits related to Earth resources, technology, and new products.

2) Tell about main steps in humanity's movement into space and tell the contributions of these individuals: Jules Verne, K.E. Tsiolkovsky, Robert Goddard, Hermann Oberth, and Werner von Braun.

3) Build, launch, and recover a model rocket.

***** If local laws prohibit the launching of 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.

Make a second launch to accomplish a specific objective. (Rocket must be built to meet the safety code of the National Association of Rocketry.) 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 the Earth and pictures of other planets are made and transmitted.

5) Discuss what has been learned about the Moon and planets by manned and unmanned spacecraft exploration and the possible benefits of new knowledge. Do TWO of the following:

A) Construct a data table of recent information about the planets. For each planet, give the important facts, including distance from the sun, period of revolution, rotation, number of moons, etc.
B) Make a scrapbook of magazine photographs and news clippings about planetary research.
C) Design a spacecraft that will be sent on a mission to another planet to take samples of its surface and return them to Earth. Name the planet your spacecraft will visit; and, in your design, show how your spacecraft will work and cope with the environment of that planet.

6) Describe the purpose and operation of the space shuttle. Discuss the following:

A) Main components
B) Typical mission profile
C) Payloads

7) Design an Earth-orbiting space station. Make drawings or a model of your station. Within your design, consider and plan the following:

A) Source of energy
B) How it will be constructed
C) Life-support systems
D) Purpose and function

8) Discuss with your counselor two possible careers in space exploration.

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Requirement 1

What is the purpose of space exploration? _____

What is the historical reason for space exploration? _____

What are the immediate goals, in terms of specific knowledge, of space exploration? _____

Requirement 2

Tell about main steps in humanity's movement into space: _____

Tell the contributions to space exploration that the following individuals made:

Jules Verne: _____

K.E. Tsiolkovsky: _____

Robert Goddard: _____

Hermann Oberth: _____

Werner von Braun: _____

Requirement 3

Build, launch, and recover a model rocket. Briefly describe your model, how you built it, the launch, and recover: _____
_____
_____
_____
_____
_____

***** If local laws prohibit the launching of model rockets, do the following activity:

Make a model of a NASA rocket. Briefly describe your model and how you built it: _____
_____
_____
_____
_____
_____

Identify and explain the functions of the parts:

Part: _____ Function: _____

Part: _____ Function: _____

Part: _____ Function: _____

Part: _____ Function: _____

Part: _____ Function: _____

Part: _____ Function: _____

Part: _____ Function: _____

Part: _____ Function: _____

Part: _____ Function: _____

Part: _____ Function: _____

Give the history of the rocket: _____
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_____ Make a second launch to accomplish a specific objective.

State your objective? _____
_____
_____

Was your objective met? YES NO

Does your rocket meet the safety code of the National Association of Rocketry? YES NO (Must be able to answer YES)

Extra Mile - NOT REQUIRED for Merit Badge

Briefly describe the safety code of the National Association of Rocketry AND why you think the safety code exists: _____
_____
_____
_____
_____
_____
_____
_____
_____
_____
_____

Demonstrate to your counselor that you can identify the following rocket parts. Give an explanation of each rocket part:

Body Tube: _____
_____
_____

Engine Mount: _____
_____
_____

Fins: _____
_____
_____

Igniter: _____
_____
_____

Launch Lug: _____
_____
_____

Nose Cone: _____
_____
_____

Payload: _____
_____
_____

Recovery System: _____
_____
_____

Rocket Engine: _____
_____
_____

Requirement 4

What is the law of action-reaction? _____

Describe how rocket engines work: _____

Describe how satellites stay in orbit: _____

Describe how satellite pictures of the Earth and pictures of other planets are made and transmitted: _____

Demonstrate each of the following:

___ Law of action-reaction ___ How rocket engines work ___ How satellites stay in orbit

___ How satellite photos are taken and transmitted.

Requirement 5

Use the area below to explain what has been learned about the Moon and other planets by manned and unmanned spacecraft exploration: _____

What are some of the possible benefits of newly gathered knowledge: _____

You now have three options to choose from to complete this requirement. Select and complete two of the options.

If you selected ***Option A***:

Construct a data table of recent information about the planets. For each planet, give important facts, including distance from the sun, period of revolution, number of moons, etc. You can use the chart below or you can create a different one and attach it to this worksheet when you are done. Show the worksheet to your counselor.

Planet	Distance From Sun	Period Of Revolution	Rotation	Number Of Moons	Important Facts	Other

If you selected ***Option B***:

_____ Make a scrapbook of magazine photographs and news clippings about planetary research. Show your collection to your counselor.

If you selected ***Option C***:

Design a spacecraft that will be sent on a mission to another planet to take samples of its surface and return them to Earth. Draw your spacecraft in the space below: In your design show how your spacecraft will work and cope with the environment of that planet.

What planet will your spacecraft go to? _____

Describe how your spacecraft will work: _____
_____
_____
_____
_____

How will your spacecraft cope with the environment? _____
_____
_____
_____
_____

Requirement 6

Describe the purpose and operation of the space shuttle: _____

What are the main components of the space shuttle? _____

Describe a typical mission profile: _____

Describe the payloads carried by the space shuttle: _____

Requirement 7

For this requirement you are to design an Earth-orbiting space station. You can make drawings or build a model of your station.

What will be your stations source of energy? _____
_____
_____
_____
_____

How will your station be constructed? _____
_____
_____
_____
_____

Describe the life-support system(s) your station will have: _____
_____
_____
_____
_____

What will be the purpose and function of your space station? _____
_____
_____
_____
_____

_____ Complete your drawings or your model of your space station and show them to your counselor.

Requirement 8

Discuss with your counselor two possible careers in space exploration. Name them below and give a brief description or outline of what you found out about each occupation.

Occupation: _____

Description: _____
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Occupation: _____

Description: _____
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