

Galactic Explorer

Patch Workbook



This book belongs to: _____



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Preface

This workbook is to be used to complete the requirements for the Galactic Explorer patch. Each item must be completed. Each item must have an adult's initials (not a parent) verifying completion.

When this booklet is finished the awardee will have a thorough knowledge of various aspects of astronomy. Completion of this booklet is a significant achievement and demonstrates a high level of interest, knowledge, and dedication.

We have written this booklet to fulfill a much needed niche in the Science, Technology, Engineering, and Mathematics (STEM) fields for our youth, who get at best a scant overview of their place within a truly immense universe. While this patch is geared toward Cadettes, Seniors, and Ambassadors, younger girls can accomplish much of it if they are motivated. Adults with curiosity are also encouraged to complete this booklet and earn the patch as well.

Topics covered are:

- I. Safety
- II. Telescopes
- III. Constellations
- IV. The Solar System
- V. Deep Space
- VI. Observing the Universe

Enjoy!

The Stars are only the Beginning....

I. Safety

By and large, astronomy is a very safe activity. However, there are precautions one needs to take in order to safely view the sky.

_____ Explain why you should never look at the Sun directly.

_____ Being outdoors in the evening brings out creatures that are intent on getting some of your blood for their babies. Name at least one creature and how you can prevent it from getting some of you.

_____ When working around (powered) telescopes, name two dangers that might exist and how you can avoid being hurt.

_____ Cold weather usually brings the best clear skies. It is also exceedingly dangerous for Humans. What items of clothing should you have on during this season. Name at least four items:

_____ Hot weather has it's own unique dangers as well. List at least two items that you should bring to an observation session to keep you in good health.

II. Telescopes

There are two basic types of optical telescopes: Make a drawing of each type and show how light travels through the telescope to your eye. Label each drawing with its name.

_____ Name two other types of telescopes that are not optical and what they are used for.

1. _____
2. _____

_____ Important to the “health” of astronomical equipment is their storage to avoid damage to the optics. Explain what important steps must be followed to prevent dirt and dust from getting on the optics.

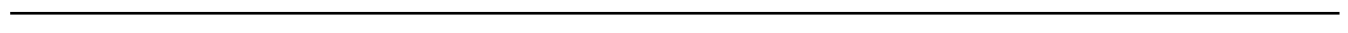
III. Constellations

Sketch the North Star and the stars that show you where it is.

On this and the next page sketch and name three constellations of your choice.

_____ Constellation

_____ Constellation

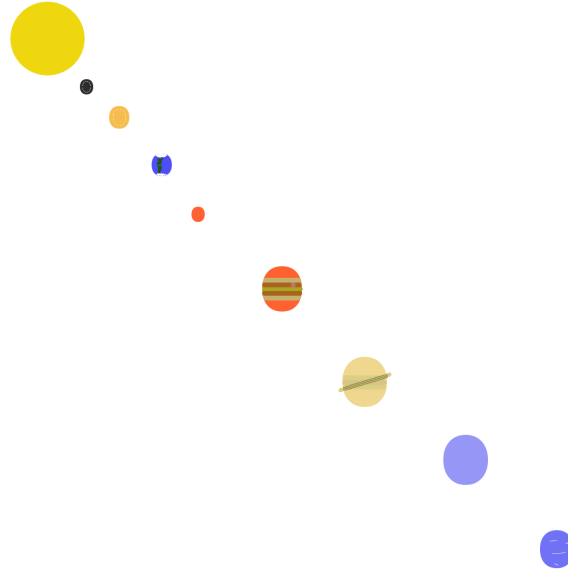


_____ Constellation

IV. Solar System

_____ List all eight planets in the order of closest to furthest from the Sun.

- 1 _____
- 2 _____
- 3 _____
- 4 _____
- 5 _____
- 6 _____
- 7 _____
- 8 _____



_____ Which planet is the hottest? _____

_____ Which planet generates more heat than it gets from the Sun? _____

_____ Mars is often called the “Red Planet”. Why is it reddish in color? _____

_____ Voyager I and Voyager II are two spacecraft sent to explore our Solar System. Where are they now?

_____ Draw your favorite planet below. Give enough details so that it is obvious which it is. Do not label it. Write down on a separate piece of paper it's name and show the drawing to your mentor. By the drawing alone can he/she name the planet? If not add more details. Show him/her the paper. If correct you passed this one!

What is a mare? _____

What is a crater? _____

Draw the Earth's Moon giving at least 5 mare and 5 craters, all of them labeled.

Draw the positions of the Earth, Sun, and Moon during any three (3) of the following:

- New Moon
- $\frac{1}{4}$ Moon
- Full Moon
- Lunar Eclipse
- Solar Eclipse

Be sure to label each drawing

1

2

3

_____ Draw the sun showing sunspots and flares using the form on the next page

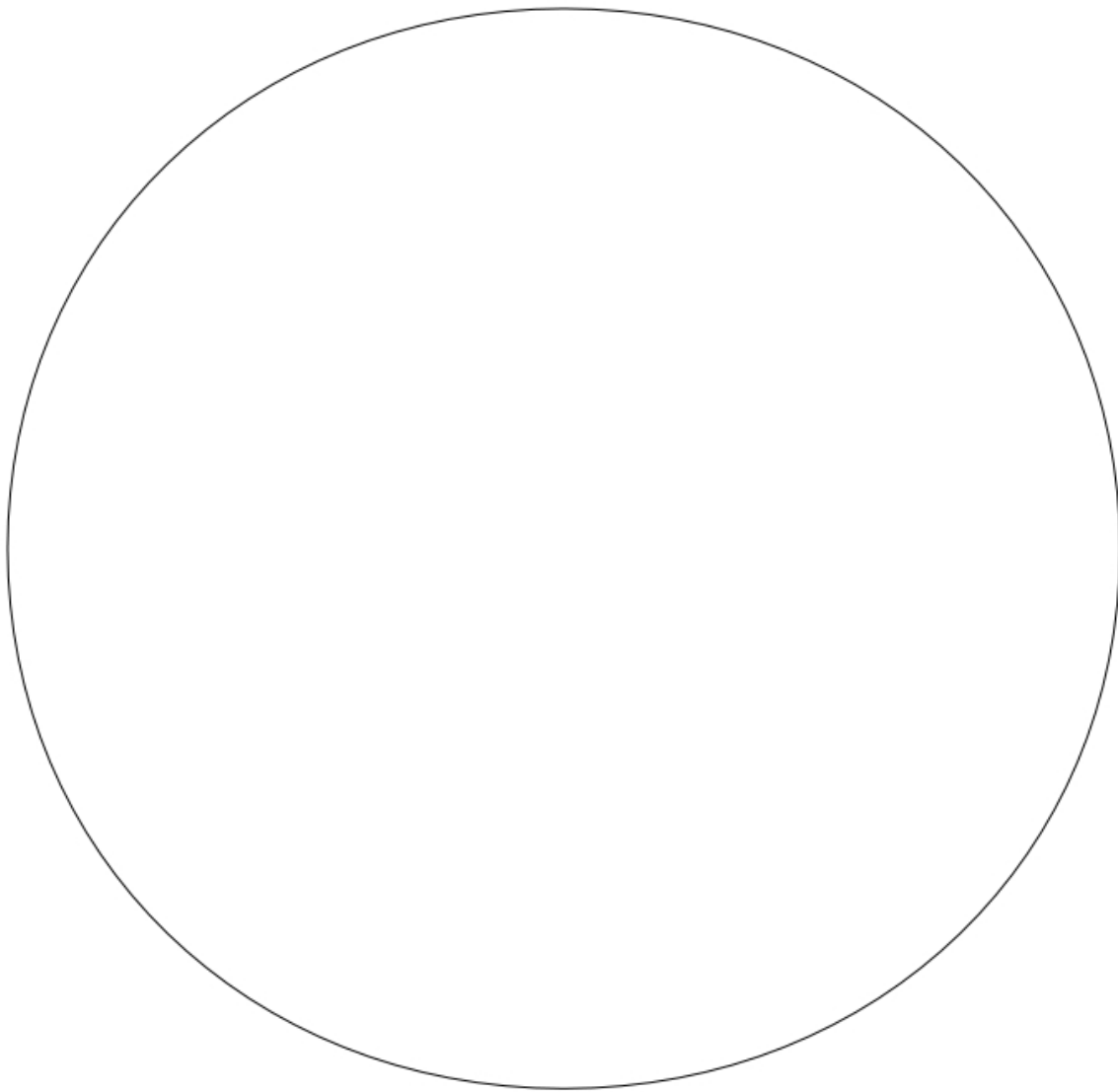
Solar Observation

Date: _____ Name: _____

Time (GMT) _____ Location: _____

_____ N _____

_____ W _____



The Sun radiates energy in several frequencies, some of which are deadly to life. Describe two forms of energy it releases and its effects.

1. _____

2. _____

Describe how the Sun generates this energy.

Describe sunspots and what effect upon the sun and earth they have

The visual color of stars reveals their types. Briefly describe the following colors of stars and what they mean in terms of temperature and likely age:

1. Red _____

2. Yellow _____

3. Blue _____

V. Deep Space

_____ Draw any two of the following groups of objects and label them:

- Open Cluster
- Globular Cluster
- Spiral Galaxy
- Barred Spiral Galaxy
- Binary Stars

1) _____

2) _____

_____ What is the name and type of galaxy we live in?

_____ Approximately how many stars are in our galaxy? _____

_____ Describe what a habitable zone is and where within a solar system it lies.

_____ Approximately how many exo-planets have been discovered? _____

_____ How many of these exo-planets are in the habitable zone of their stars? _____

_____ As far as we know there is no other life in the entire universe. Besides being in the habitable zone what is the one element that we believe is crucial for life? (It's a liquid) _____

VI Observing the Universe

_____ Create an observation plan. Using a table, list the object names or identifiers and in columns list their Magnitude, Right Ascension, Declination, Type of Object (Ice. planet, globular cluster), approximate altitude and azimuth, or description of how to find it (i.e. 45° | 234° or 1° SW of Spica). Use the remainder of this page or attach the observation list.

Galactic Explorer Patch Notebook

Completed _____(Date) Verified by _____

Patch awarded: _____(Date)