

ASTRONOMY

Prepared by:

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Target Group:

Due to the nature of this badge, this activity is recommended for Scouts who have completed the 7th grade or higher.

Pre-Requisites:

None, but 6b must be completed by the scout outside of merit badge time

Materials Needed – Staff:

Compass
Constellation Identification Guide
Sketch Paper
Pencils
Telescope
Binoculars
Moon Map
Planet fact book
Sky Scout
Planetarium
Laser

Materials Needed – Scout:

Astronomy Merit Badge Book
Pen/pencil
Notebook

Instructional Outcomes:

Upon completion of this activity, the Scout will possess a good introductory base of knowledge about astronomy. This includes knowledge of the basic physical concepts, constellations, heavenly bodies and telescopes, planetary motion and will be able to determine location and direction using the stars and the moon.

MONDAY

Requirement 1

- (a) Explain to your counselor the most likely hazards you may encounter while participating in astronomy activities, and what you should do to anticipate, help prevent, mitigate, and respond to these hazards.
- (b) Explain first aid for injuries or illnesses such as heat and cold reactions, dehydration, bites and stings, and damage to your eyes that could occur during observation.
- (c) Describe the proper clothing and other precautions for safely making observations at night and in cold weather.
- (d) Explain how to safely observe the Sun, objects near the Sun and solar eclipses

Requirement 2

Explain what light pollution is and how it and air pollution affect astronomy.

Requirement 6a

Sketch the face of the moon and indicate at least five seas and five craters. Label these landmarks.

Requirement 6b

Sketch the phase and position of the Moon, at the same hour and place, for four nights within a one-week period. Include landmarks on the horizon such as hills, trees, and buildings. Explain the changes you observe.

This should be done by the scouts in their campsites each night and returned on Friday

Requirement 8c

****PLANNING PORTION****

Plan and host a star party for your Scout troop or other group such as your class at school. Use binoculars or a telescope to show and explain celestial objects to the group.

Have scouts research what will be visible in the night sky that evening, and have each scout pick a celestial object to explain to the group that evening.

MONDAY NIGHT

Requirement 6b

Sketch the phase and the daily position of the Moon, at the same hour and place, for four days in a row. Include landmarks on the horizon such as hills, trees, and buildings.

Explain the changes you observe.

Help the scouts do this for Monday night, distribute paper/pencils if needed. Reiterate that they need to continue to do this on their own for the next three nights.

**Note: This requirement can be completed at Camp, as long as the Scout knows to begin the requirement Sunday night. -> may be able to complete even starting on Monday.*

Requirement 8c

Plan and host a star party for your Scout troop or other group such as your class at school. Use binoculars or a telescope to show and explain celestial objects to the group.

**Note: The star party is an event that is open to anyone in camp who would like to attend. The instructor should make this event exciting and possibly include something like a treat for this event (i.e. Star Crunch, Cosmic Brownies, Moon Pies, etc.).*

Remember to purchase req/ have the AD purchase req the snacks

Requirement 4

Do the following (if instruction is done in a planetarium, Scouts must all identify the required stars and constellations outside under the natural night sky):

- Identify in the sky 10 constellations, at least four of which are in the zodiac.
- Identify in the sky eight conspicuous stars, ve of which are of magnitude 1 or brighter.
- Make two sketches of the Big Dipper or Cassiopeia from direct observation. In one sketch, show the Big Dipper's or Cassiopeia's orientation in the early evening sky. Make another sketch, showing its position several hours later. In both sketches, show the North Star and the horizon. Record the date and me each sketch was made.
- Explain what we see when we look at the Milky Way.

Requirement 5d

Observe a planet and describe what you saw.

TUESDAY

Requirement 6c

List the factors that keep the Moon in orbit around Earth.

Requirement 3

With the aid of diagrams (or real telescopes if available), do each of the following:

- (a) Explain why binoculars and telescopes are important astronomical tools.
Demonstrate or explain how these tools are used.
- (b) Describe the similarities and differences of several types of astronomical telescopes, including at least one that observes light beyond the visible part of the spectrum (i.e., radio, X-ray, ultraviolet, or infrared).
- (c) Explain the purposes of at least three instruments used with astronomical telescopes.
- (d) Describe the proper care and storage of telescopes and binoculars both at home and in the field

Requirement 4d

Explain what we see when we look at the Milky Way.

WEDNESDAY

Requirement 4c:

Make two sketches of the Big Dipper. In one sketch, show the Big Dipper's orientation in the early evening sky. In another sketch, show its position several hours later. In both sketches, show the North Star and the horizon. Record the date and time each sketch was made.

Requirement 7

Do the following:

- (a) Describe the composition of the Sun, its relationship to other stars, and some effects of its radiation on Earth's weather and communications.
- (b) Define sunspots and describe some of the effects they may have on solar radiation.
- (c) Identify at least one red star, one blue star, and one yellow star (other than the Sun).
Explain the meaning of these colors.

THURSDAY

Requirement 5

Do the following:

- (a) List the names of the five most visible planets. Explain which ones can appear in phases similar to lunar phases and which ones cannot, and explain why.
- (b) Using the Internet (with your parent's permission) and other resources, find out when each of the five most visible planets that you identified in requirement 5a will be observable in the evening sky during the next 12 months, then compile this information in the form of a chart or table.
- (c) Describe the motion of the planets across the sky.

**Activity: Compare proportions of planets' distances: Use the planet walk sheet in the Astronomy binder and take scouts on the walk, it will start at the red cedar under the PA system and end at the trading post vending machines.*

FRIDAY

Requirement 6d

With the aid of diagrams, explain the relative positions of the Sun, Earth, and the Moon at the times of lunar and solar eclipses, and at the times of new, first-quarter, full, and last-quarter phases of the Moon.

Requirement 9

Identify three career opportunities that would use skills and knowledge in astronomy. Pick one and research the training, education, certification requirements, experience, and expenses associated with entering the field. Research the prospects for employment, starting salary, advancement opportunities and career goals associated with this career. Discuss what you learned with your counselor and whether you might be interested in this career.