



# NOVA AWARD

SCOUTS BSA  
MIDDLE/HIGH SCHOOLERS

Use this tracking tool for the Shoot! Nova Award for Scouts BSA

SCOUT NAME: \_\_\_\_\_

## Activity

## Campground Area

## Completed?

Read articles or watch videos of space exploration, space, planets for a total of 3 hours

Launch Pad  
Dining Hall  
*All subject days*

Complete 1 merit badge from the list on the next page

See next page

Design and build a catapult that will launch a marshmallow a distance of 4 feet and keep track of your experimental data for every attempt.

The Lab  
*Engineering*

**Complete 1 of the following** (find details on Mission Control and on the next page):

Find and use a projectile simulation applet on the Internet. Then design and complete a hands-on experiment to demonstrate projectile motion.

The Lab  
*Engineering*

Learn about the difference between escape velocity, orbital velocity, and terminal velocity.

The Lab  
*Career Exploration*

**Complete 1 of the following** (find details on Mission Control and on the next page):

Visit an observatory or a flight, aviation, or space museum

Launch Pad  
*Space Exploration*

Discover the latitude and longitude coordinates of your current position. Then find out what time a satellite will pass over your area and watch the satellite using binoculars.

The Lab  
*Astronomy*

Meet with a Nova Counselor to discuss what you've learned.

Zoom Meeting  
or on own



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**Use this tracking tool for the Shoot! Nova Award for Scouts BSA.  
Below are details for each requirement.**

- Read articles or watch videos of space exploration, space, planets for a total of 3 hours** (*Launch Pad & Dining Hall*)
- Complete ONE merit badge from the following list:** (*throughout the campground*)
  - Astronomy
  - Space Exploration
  - Robotics
  - Any of them following not included in Cyber Summer Camp, but have not been used for another Nova Award:

Archery	Game Design	Sustainability
Aviation	Rifle Shooting	Weather
Athletics	Shotgun Shooting	
- Design and build a catapult that will launch a marshmallow a distance of 4 feet.** (*The Lab*)
  - Keep track of your experimental data for every attempt. Include the angle of launch and the distance projected.
  - Make sure you apply the same force each time, perhaps by using a weight to launch the marshmallow.
- Complete 1 of the following** (*The Lab or Launch Pad*):
  - Simulations.** Find and use a projectile simulation applet on the Internet. Then design and complete a hands-on experiment to demonstrate projectile motion.
    - Keep a record of the angle, time, and distance.
    - Graph the results of your experiment. (*Note: Using a high-speed camera or video camera may make the graphing easier, as will doing many repetitions using variable heights from which the projectile can be launched.*)
  - Discover.** Explain the difference between escape velocity (not the game), orbital velocity, and terminal velocity. Then answer TWO of the following questions.
    - Why are satellites usually launched toward the east, and what is a launch window?
    - What is the average terminal velocity of a skydiver? (What is the fastest you would go if you were to jump out of an airplane?)
    - How fast does a bullet, baseball, airplane, or rocket have to travel in order to escape Earth's gravitational field? (What is Earth's escape velocity?)
- Complete 1 of the following** (*Launch Pad, The Lab, and Dark Side of the Moon*):
  - Visit an observatory or a flight, aviation, or space museum.
    - During your visit, talk to a docent or person in charge about a science topic related to the site.
  - Discover the latitude and longitude coordinates of your current position.
    - Find out what time a satellite will pass over your area. (A good resource to find the times for satellite passes is the Heavens Above website at [www.heavens-above.com](http://www.heavens-above.com).)
    - Watch the satellite using binoculars. Record the time of your viewing, the weather conditions, how long the satellite was visible, and the path of the satellite.
- Meet with a Nova Counselor to discuss what you've learned.**