Launch!

Venturer Nova Award Workbook

This workbook can help you but you still need to read the Venturer Nova Awards Guidebook.
This Workbook can help you organize your thoughts as you prepare to meet with your counselor.
You still must satisfy your counselor that you can demonstrate each skill and have learned the information.
You should use the work space provided for each requirement to keep track of which requirements have been completed, and to make notes for discussing the item with your counselor, not for providing full and complete answers.
If a requirement says that you must take an action using words such as "discuss", "show", "tell", "explain", "demonstrate", "identify", etc, that is what you must do.

Counselors may not require the use of this or any similar workbooks.

No one may add or subtract from the official requirements found in the Venturer Nova Awards Guidebook (Pub. 34031).
The requirements were issued in 2012 • This workbook was updated in June 2018.

Venturer's Name: _____ Unit: _____

Counselor's Name: _____ Counselor's Phone No.: _____

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

Please submit errors, omissions, comments or suggestions about this **workbook** to: **Workbooks@USScouts.Org**
Send comments or suggestions for changes to the **requirements** for the **Nova Award** to: **Program.Content@Scouting.Org**

This module is designed to help you explore how science affects your life each day

1. Choose A *or* B or C and complete ALL the requirements.

☐ A. Watch about three hours total of science-related shows or documentaries that involve projectiles, aviation, weather, astronomy, or space technology.

What was watched?	Date	Start Time	Duration

Some examples include—but are not limited to—shows found on PBS ("NOVA"), Discovery Channel, Science Channel, National Geographic Channel, TED Talks (online videos), and the History Channel. The NASA website at http://www.nasa.gov has some short multimedia clips that involve projectiles, aviation, space, weather, astronomy, or aviation or space technology .You may choose to watch a live performance or movie at a planetarium or science museum instead of watching a media production. You may watch online productions with your counselor's approval and under your parent's supervision.

Then do the following:

1. Make a list of at least two questions or ideas from each show.

2. Discuss two of the questions or ideas with your counselor.

1.

2.

☐ B. Read (about three hours total) about projectiles, aviation, space, weather, astronomy, or space technology.

What was read?	Date	Start Time	Duration

Examples of magazines include—but are not limited to—*Odyssey, Popular Mechanics, Popular Science, Science Illustrated, Discover, Air & Space, Popular Astronomy, Astronomy, Science News, Sky & Telescope, Natural History, Robot, Servo, Nuts and Volts,* and *Scientific American*.

Then do the following:

1. Make a list of at least two questions or ideas from each article.

2. Discuss two of the questions or ideas with your counselor.

   1.

2.

☐ C Do a combination of reading and watching (about three hours total).

What was watched or read?	Date	Start Time	Duration

Then do the following:

1. Make a list of at least two questions or ideas from each article or show.

2. Discuss two of the questions or ideas with your counselor.

1.

2.

2. Choose ONE STEM field of interest from the following list. Complete ALL the requirements for a Venturing STEM exploration in that field. (If you have already completed a Venturing STEM exploration in one of these fields, please choose a different field for this award.)

☐ Archery	☐ Aviation	☐ Shotgun Shooting
☐ Astronomy	☐ Rifle Shooting	☐ Space Exploration
☐ Athletics	☐ Robotics	☐ Weather

3. Choose A or B and complete ALL the requirements.

☐ A. **Simulations.** Find and use a projectile simulation applet on the Internet (with your parent's or guardian's permission). Then design and complete a hands-on experiment to demonstrate projectile motion.

☐ 1. Keep a record of the angle, time, and distance.

☐ 2. 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,

Helpful Links

Be sure you have your parent's or guardian's permission before using the Internet. Some of these websites require the use of Java runtime environments. If your computer does not support this program, you may not be able to visit those sites.

Projectile Motion Applets Website:
http://www.mhhe.com/physsci/physical/giambattista/proj/projectile.html

Fowler's Physics Applets Website:
http://galileoandeinstein.physics.virginia.edu/more_stuff/AppletsProjectileMotion/enapplet.html

Java Applets on Physics Website:
http://www.walter-fendt.de/ph14e/projectile.htm

☐ 3. Discuss with your counselor

a. What a projectile is

b. What projectile motion is

c. The factors affecting the path of a projectile

d. The difference between forward velocity and acceleration due to gravity.

☐ B. **Discover.** Explain to your counselor the difference between escape velocity (not the game), orbital velocity, and terminal velocity.

Escape velocity	
Orbital velocity	
Terminal velocity	

Then answer TWO of the following questions. (With your parent's or guardian's permission, you may wish to explore websites to find this information.)

☐ 1. Why are satellites usually launched toward the east, and what is a launch window?

☐ 2. 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?)

☐ 3. 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?)

4. Choose A or B and complete ALL the requirements.

☐ A. Visit an observatory or a flight, aviation, or space museum.

Location visited:

1. During your visit, talk to a docent or person in charge about a science topic related to the site

2. Discuss your visit with your counselor.

☐ B. Discover the latitude and longitude coordinates of your current position.

Latitude: Longitude:

Then do the following:

☐ 1. 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.)

☐ 2. 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.

The time of your viewing	
The weather conditions	
How long the satellite was visible	
Path of the satellite	

Then discuss your viewing with your counselor.

5. Choose A or B or C and complete ALL the requirements.

☐ A. Design and build a catapult that will launch a marshmallow a distance of 4 feet.

Then do the following:

1. Keep track of your experimental data for every attempt. Include the angle of launch and the distance projected.
2. Make sure you apply the same force every time, perhaps by using a weight to launch the marshmallow.

Discuss your design, data, and experiments—both successes and failures—with your counselor.

☐ B. Design a pitching machine that will lob a softball into the strike zone. Answer the following questions, and discuss your design, data, and experiments—both successes and failures—with your counselor.

1. At what angle and velocity will your machine need to eject the softball in order for the ball to travel through the strike zone from the pitchers mound?
2. How much force will you need to apply in order to power the ball to the plate?

3. If you were to use a power supply for your machine, what power source would you choose and why?

Discuss your design, data, and experiments—both successes and failures—with your counselor.

☐ C. Design and build a marble run or roller coaster that includes an empty space where the marble has to jump from one part of the chute to the other. Do the following, then discuss your design, data, and experiments—both successes and failures—with your counselor.

1. Keep track of your experimental data for every attempt. Include the vertical angle between the two parts of the chute and the horizontal distance between the two parts of the chute.

2. Experiment with different starting heights for the marble.

How do the starting heights affect the velocity of the marble?

How does a higher starting height affect the jump distance?

Discuss your design, data, and experiments—both successes and failures—with your counselor.

6. Discuss with your counselor how science affects your everyday life.

When working on Nova and Supernova awards, 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-nova.pdf.
You can download a complete copy of the *Guide to Advancement* .from http://www.scouting.org/filestore/pdf/33088.pdf.