Lesson Plan for "Out of This World" Cub Scout Nova
Using Slooh Resources

This document provides some suggestions and resources for helping your Cub Scouts learn about space exploration while they earn the *Out of this World* Nova, using the resources available at Slooh. Where requirements involve options, the ones below are suggested, but you are free to choose alternative requirements to earn the Nova award.

You will need to contact a BSA-approved Nova Counselor who can work with your scout and certify completion of the requirements. Your local council should be able to provide names and contact information.

You must follow all Youth Protection Training guidelines at all activities, including having a second adult copied on every communication, whether in person or electronic.

To begin, go online to Slooh.com/scouts to set up your individual account, or look for an email invitation from your unit leader if your unit is forming its own astronomy club.

A Note on Time:
Slooh's five telescopes are located in the Canary Islands, off the coast of Spain. As such, they are 4 hours later than East Coast time in the United States, which allows scouts in the United States to make observations during their early evening. Time on the Slooh web site is reported in UTC (Coordinated Universal Time), which you will have to convert into your local time. Web sites such as https://earthsky.org/astronomy-essentials/universal-time can be helpful for this purpose.

Requirement 1A

Watch an episode or episodes (not less than one hour total) of a show about the planets, space, space exploration, NASA, or astronomy. Then do the following:

1. Make a list of at least two questions or ideas from what you watched.
2. Discuss two of the questions or ideas with your counselor.

Use the "Shows" menu on Slooh to watch some pre-recorded shows.

White House Astronomy Night (Bob hosting with Will guesting and Tamara Hudgins, Exec Director of Girlstart)
https://www.slooh.com/shows/video-viewer/256

Students Present the Andromeda Galaxy for White House Astronomy Night
https://www.youtube.com/watch?v=WT1_Tn5Kn7o

Students Present the Dumbbell Nebula for White House Astronomy Night
https://www.youtube.com/watch?v=crt3L2iktCk

And the full show was here: https://www.youtube.com/watch?v=of02weNLVBI

Aliens and Exoplanets (2 hours)
https://www.slooh.com/shows/video-viewer/328

45th Anniversary of the Apollo 11 Moon Landing (does have Geoff Fox hosting but a very informative show with Bob on form)
https://www.slooh.com/shows/video-viewer/66

Total Lunar Eclipse 2019 (one of our best informationally and visually but 2hrs 45hrs Raquel Nuno guests)
https://www.slooh.com/shows/video-viewer/604

Monsters' Lounge (lively show with Paul, Paige, Helen)
https://www.slooh.com/shows/video-viewer/595

Icelandic Aurorae on the Road to the Eclipse (45-mins Will Gater hosts - great visuals, very informative)
https://www.slooh.com/shows/video-viewer/106

Dr. Godfrey's Intro to Astronomy - the Solar System (45-mins but uses old website)
https://www.slooh.com/shows/video-viewer/479

Constellation Stories with Helen Avery - Ursa Major (Slow-paced but informative)
https://www.slooh.com/shows/video-viewer/530

The Story of our Local Star - The Sun (each 15-20 mins long and very digestible)
Episode 1: https://www.slooh.com/shows/video-viewer/560
Episode 2: https://www.slooh.com/shows/video-viewer/561
Episode 3: https://www.slooh.com/shows/video-viewer/563
Episode 4: https://www.slooh.com/shows/video-viewer/564
Episode 5: https://www.slooh.com/shows/video-viewer/565
Episode 6: https://www.slooh.com/shows/video-viewer/568

Transit of Mercury 2019 (Note this one is 5hrs 40mins long)
https://www.slooh.com/shows/video-viewer/639

Transit of Venus
https://youtu.be/-nXv9YvkNyA

Giant Asteroid Hurtles Past Earth!
https://www.slooh.com/shows/video-viewer/637

Comet Week: The Naked Eye Comet (30-mins hosted by Bob with good live visuals)
https://www.slooh.com/shows/video-viewer/273

Watch the Sun Live at Equinox (has the old website but good explanations of Earth's orbit and seasons in a 45-min show)
https://www.slooh.com/shows/video-viewer/526

The Search for Planet Nine (Athena Brensberger, Phil Plait, Dr. Kirby Runyon guest)
https://www.slooh.com/shows/video-viewer/448

How Our Sun Compares (Audio show but does have some visuals with Paige)
https://www.slooh.com/shows/video-viewer/555

The Moon 101 with Dr. Paige Godfrey (40-mins does use the old website)
https://www.slooh.com/shows/video-viewer/586

A Three Dimensional Sky (Paige 25-mins but uses old website)
https://www.slooh.com/shows/video-viewer/615

Where is the Missing Universe? (a great little 12-min show by Bob with some nice live feeds)
https://www.slooh.com/shows/video-viewer/194

Slooh Motion Videos:
Tutankhamun's Alien Dagger (6 mins)
https://www.slooh.com/shows/video-viewer/336

Saturn at Opposition
https://www.slooh.com/shows/video-viewer/364

"Discover" Galileo's Moons (8 min very informational)
https://www.slooh.com/shows/video-viewer/290

Slooh Launches Huge New Chile Telescope! (fun, current, informational with great live views)
https://www.slooh.com/shows/video-viewer/643

Winter is Coming - The Possible Mini Ice Age (Hosted by Bob with Lucie Green guesting)
https://www.slooh.com/shows/video-viewer/148

Requirement 2, Option A

Do all of the following, and then discuss with your counselor what kind of science, technology, engineering, and math was used in each activity.

(a) Demonstrate how to focus a simple telescope or binoculars.

See "Getting to Grips With Your New Telescope" (https://www.space.com/24499-new-telescope-user-guide.html) or "How To Focus Binoculars: A Guide For Beginners" (https://outdoorspike.com/how-to-focus-binoculars/) for instructions on how to do this. If you do not have a telescope or binoculars, your local library may have one that you can borrow.

Use the Starter Quests (100 level) to:

"The Sun – Our Local Star" – capture an image of the sun
"The Brightest Star" – Compare two stars, one in our solar system and one in the Milky Way
"The Moon – Earth's Satellite" – reserve a mission to the moon
"The Midnight Culmination of the Pleiades." – learn to optimize image quality
"Cosmic Explorer" – Capture images of six celestial objects. August to April only.

(b) Draw a diagram of our solar system. Identify the planets and other objects.

(c) Draw and label five constellations. See if you can locate any of them in the sky using a star map.

Use the Slooh Guides menu to see the "Guide to Constellations." Scroll down past the "Featured Observation" to the actual content.

Requirement 3, Options A and F

3A. Have a (virtual) star party with your den, pack, or family. (Make sure you wear proper clothing for the nighttime temperature.) Compare what they see from their backyard to what you can see from yours.
1. Choose a clear night to investigate the stars. A fun time to watch stars is during a meteor shower. You may check http://earthsky.org/astronomy-essentials with your parent's or guardian's permission to find good times to watch meteors.
2. Find five different constellations and draw them (different from those used for Requirement 2.a.c). With your parent's or guardian's permission, you may use a free smartphone application such as Google Sky Map for Android phones or Night Sky for iPhones to help identify stars and constellations.
3. Share your drawings with your counselor. Discuss whether you would always be able to see those constellations in the same place.

The Constellation Guide on slooh.com might be helpful here.

3F. Eclipses
1. Investigate and make models or diagrams of solar and lunar eclipses. (Example: You may wish to use balls of different sizes and a flashlight to represent the sun.)

2. Using your model or diagram, discuss eclipses with your counselor, and explain the difference between a solar eclipse and a lunar eclipse.

To learn about eclipses, read one of the three eclipse guides:
2019 Partial Lunar Eclipse, 2019 Total Solar Eclipse, or 2020 Penumbral Lunar Eclipse

(Go to "Guides", and search on "Eclipse" and you should see all three)

Requirement 4A

A. Visit a place where space science is being done, used, explained, or investigated, such as one of the following: observatory, planetarium, air and space museum, star lab, astronomy club, NASA, or any other location where space science is being done, used, explained, or investigated. During your visit, talk to someone in charge about how people at the location use or investigate space science. Find out how this investigation could make the world a better place.
Discuss with your counselor the science being done, used, explained, or investigated at the place you visited.

Slooh has two shows that are behind the scenes tours of their telescopes:
Behind the Slooh Solar Scope
https://youtu.be/993Hha7zHyU

Slooh Launches Huge New Chile Telescope
https://youtu.be/GLUFik4fvzw

After watching the tour, contact education@slooh.edu to discuss your questions with a staff member.

In addition, the NASA Langley Research Center (https://oh.larc.nasa.gov/oh/) and NASA Glenn Research Center (https://www.nasa.gov/glennvirtualtours) both have online tours. With your parent or guardian's permission, you can use the Feedback or Facebook links to send questions to one of the researchers there.

Requirement 5

Tell your counselor what you have learned about space exploration while working on this award.