Advanced Academy
Lesson Overviews
FY 2018

Early Space History
This briefing explains the progression of rocket design from fireworks to weapons of war and then for use in space travel. In the briefing, we will discuss the great minds involved in rocket building and design and beginning ideas about space travel. This briefing will bring space history to the beginnings of the Space Race.

Engineering Extreme Environments
As we explore extreme environments like the moon, Mars, and asteroids, we need the right tools to safely collect and study samples—and in some instances—return them to Earth. After reviewing how this has been accomplished in the past and ways we will do so in the future in the E3 Intro, trainees will attempt to build a system to safely retrieve as many samples as possible.

Exploration Systems Briefing & Lab
Exploration Systems is designed to prepare trainees for EDMs (Extended Duration Missions) by thoroughly examining the different systems on the International Space Station and the upcoming Orion capsules. This briefing also serves as an introduction to the accompanying Exploration Systems design challenge by providing a short history of Martian robotic exploration and the importance of protecting Earth and other celestial bodies from cross contamination.

Flight Hardware - AA
With the Space Shuttle program retired, NASA is creating a new fleet of rockets for deep space travel, and relying on commercial partners to take personnel and cargo to the ISS. This is a basic review of the hardware and tools that have been and will be used to create rockets and launch vehicles.

Future of Spaceflight
The Orion capsule and Space Launch System (SLS) is the next step in NASA's plan for space exploration. With the completion of the International Space Station, NASA is changing its focus back to the Moon, Mars, and beyond.

Hover Craft Challenge
In this challenge, trainees will use the materials available and the engineering design process to design and build a small hovercraft. The crew trainers will then time the crafts to see which one hovers the longest.

International Space
The purpose of this presentation is to introduce trainees to international space programs though fascinating stories from a few of the major players in international space, today. In addition, it is intended to engage and stimulate the imagination of young minds and to inspire them to become participants in international space in the future.

Model Rocketry Challenge
This engineering challenge is focused on the design of a model rocket capable of launch and safely recovering an egg from a designated altitude. Trainees will design and build a *safe* rocket to complete this task. All work will be documented for a score in addition to performance of their rocket.

Night Telescope
This activity provides an engaging hands-on astronomy experience with various telescopes and software in order to equip the trainee with the necessary skills to locate and view celestial objects in the night sky. This presentation will teach the history, function, and operation of both refractor and reflector telescopes as well as the use of planetarium software (indoor version only) to prepare the trainee for this experience.

Robotics Lab
After discussing Lego elements and basic robotic engineering design, trainees will work in teams to design and build a robot to maneuver through an obstacle course on Mars.

Russian Culture
Russian Space gives trainees a brief history of the Soviet Union's and Russia's role in spaceflight. Many of the Soviet Union's key firsts will be discussed in detail, as well as its role in the Space Race. Russia's position as the second largest contributor to the International Space Station and future missions beyond low Earth orbit will also be included.

Space Meds
Trainees will prepare for medical anomalies during EDMs by learning what happens to the human body in space and how to treat injuries and illnesses on Earth and in microgravity. They will also learn about the CABCs of emergency care and triage.

Space Suits - AA
In this engineering design challenge, groups must design a space suit under specific parameters that will protect their astronauts from the hazards of space.

Thermal Protection Systems
Teams will discuss how different types of thermal protection systems shield spacecraft. Using this knowledge, teams will design, build, and test a thermal protection shield to protect their "eggstronaut," using the materials provided and within a specific budget.