



Space Foundation Discovery Center Field Trip ScholarTrips **for the** **Lockheed Martin Space Education Center**

Thanks to a generous gift from the Lockheed Martin Corporation, the Space Foundation is offering **Discover Scholarships (ScholarTrips)** to select schools to experience a field trip to the Lockheed Martin Space Education Center at the Space Foundation Discovery Center. These field trips include a session in either the **AGI Space Missions Simulation Laboratory** or the **Mars Robotics Laboratory**.

The Space Foundation Discovery Center, located in Colorado Springs, is the region's first and only space, science and technology attraction. A full complement of standards-based courses are offered for PreK-12 students called **Discovery Center Field Trips**, which utilize the Discovery Center's El Pomar Space Gallery, Battelle Underwater Drove Laboratory, Lockheed Martin Space Education Center featuring the AGI Space Missions Simulation and Mars Robotics Laboratories, and the Northrop Grumman Science Center featuring Science On a Sphere® (SOS).

Each Discovery Center Field Trip course is calibrated for a specific grade-level standard, but may also be appropriate for a range of grades as noted in the course descriptions. All courses meet Colorado State academic standards.

Who is eligible for the Lockheed Martin Discover ScholarTrips:

Grades 5–12 from Title 1 schools in the State of Colorado, are welcome to apply for the Lockheed Martin ScholarTrips.

What the ScholarTrip Provides:

The following field trips will be available:

1. A "Discover Space Flight Missions Alpha or Bravo," which consists of a 120-minute Space Education Specialist-led, hands-on mission featuring Systems Tool Kit (STK), the actual modeling and visualization software used by space industry professionals. See below for available course offerings and descriptions.

OR

2. A "Discover Mars Encounter 1," which consists of a 120-minute Space Education Specialist-led, hands-on mission in a simulated Martian terrain, offering an opportunity for students to program robotic rovers to complete encounter objectives individually or in teams.



Each scholarship includes:

- Field Trip admission fee of \$10 per student with a minimum of 15 and a maximum of 30 students.
- One free adult/chaperone for every 15 students; additional adults/chaperones are \$5.00 each. *Schools should keep adults to a minimum while adhering to their district policy.*
- A subsidy for bus costs up to **\$200**. Following the field trip, each school will need to provide an invoice or recap report from the school's transportation department to the Space Foundation Discovery Center. **Transportation invoices must be submitted by May 1, 2019 or awarded subsidy will be forfeited.**

How to Apply:

Schools/Educators interested in applying for this scholarship opportunity must complete and submit the **Space Foundation Discovery Center Lockheed Martin Scholarship Application** form along with a three paragraph essay describing how such an opportunity will benefit the educators' students.

Apply online at: www.discoverspace.org/education/scholarships

Scholarships are available to all grades 5-12 to experience Discover Space Flight Missions or Discover Mars Encounter 1 field trips; however, each scholarship class must consist of students from the same grade level as courses are tailored to be grade appropriate.

Each application must be approved by either the school principal and/or a district administrator. Educators agree to provide a pre/post field trip evaluation.

Schools/Educators/Students should be made aware that this generous opportunity has been made possible by the Lockheed Martin Corporation. Although not required, at the conclusion of the program we encourage each teacher to have their class write notes of thanks that the Space Foundation will forward on to Lockheed Martin.

Scholarship Timeline:

- Application opens: **Week of October 1, 2018**
- Application deadline: **5:00pm, Friday, October 19, 2018**
- Decision Notification: **Week of October 24, 2018**
- Awarded Field Trips conducted: **October 29, 2018 – January 31, 2019**

Please email all scholarship questions to SFDCReservations@SpaceFoundation.org



Lockheed Martin Discover ScholarTrip – Field Trip Course Offerings and Descriptions

DISCOVER SPACE FLIGHT MISSIONS FIELD TRIPS: **Mission Alpha Courses**

Fully utilize the AGI Space Simulations Laboratory, including the use of the STK software:

Mission Alpha: Satellite Orbits

Satellites are an integral part of today's society. We depend on them every day from getting weather forecasts, to directions from GPS and for using our credit cards. Most people, however, know very little about how satellites work, or even where they are positioned in space to provide us that valuable data. This STK scenario teaches the basic principles of an orbiting object, and why specific orbits are chosen for a mission. Participants will use professional aerospace software to see firsthand, current satellites in their respective orbits.

Meets Colorado State Academic Standards: K-12, Science and Technology

Appropriate for: Grades 6-12

Mission Alpha: Spotting Satellites at Night

Have you ever seen a "star" moving quickly across the night sky and wondered what it was? Chances are, it was a satellite! In this lesson, participants will be able to use the powerful simulation software STK to predict where and when they will see satellites from their back yard. Spotting a satellite at night is a fun and easy thing to do with the predicting power of STK.

Meets Colorado State Academic Standards for: K-12, Science and Technology

Appropriate for: Grades 6-12

Mission Alpha: GPM Constellation

Global Precipitation Measurement (GPM) is an international satellite mission that will set a new standard for precipitation measurements from space, providing the next-generation observations of rain and snow worldwide every three hours. The GPM mission data will advance our understanding of the water and energy cycles and extend the use of precipitation data to directly benefit society. This network of satellites, called a constellation, will measure how much precipitation is occurring around the world at any one time. STK will be used to model the GPM constellation and demonstrate worldwide coverage of a satellite constellation.

Meets Colorado State Academic Standards for: K-12, Science and Technology

Appropriate for: Grades 4-12

Mission Alpha: GPS

Celebrating over 20 years of service, the Global Positioning System (GPS) has become an integral part of commerce, navigation and human safety. To better understand how it works, participants will use STK to model the GPS constellation and predict which satellites are responsible for covering their current location. Then, GPS units will be used to check the accuracy of this information.

Meets Colorado State Academic Standards for: K-12, Science and Technology

Appropriate for: Grades 6-12



Mission Alpha: Space Junk

Space is becoming an increasingly polluted place. There are currently over 22,000 pieces of orbiting material larger than a human hand circling our Earth. With the growing awareness of space debris in the movie *Gravity*, this has become a hot topic which will keep politicians and the scientific community busy for decades on devising a resolution to this problem. This lesson addresses the problem of space junk and inspires students to come up with a solution for worldwide safety.

Meets Colorado State Academic Standards for: K-12, Science and Technology

Appropriate for: Grades 6-12

Mission Bravo Courses

Utilize the AGI Space Simulations Laboratory, but without using STK software:

Mission Bravo: 3D Printing: Astronaut Tool Design Challenge

From replacements parts on the ISS to ever-popular drones, 3D printing is quickly becoming the product-making wave of the present, not just the future. At the Space Foundation, students will use Tinkercad to create 3D models. This program will familiarize students with the basics of how 3D objects are designed before being sent to the printer.

Meets Colorado State Academic Standards for: K-12, Space Science, Arts and Humanities

Appropriate for: Grade 3 - 5, Grade 6 - 8, Grade 9 - 12

Mission Bravo: Charting Mars

While it is not yet possible to visit Mars, this Mars based-field trip affords an opportunity to move around on the largest mapped surface of the red planet students may ever see. Exploring important concepts like latitude, longitude, elevation, and compass skills students will walk all over our 25' x 25' map to tangibly practice orienteering skills. This experience also includes a scavenger hunt in our museum.

Meets Colorado State Academic Standards for: K-12, Earth Science, Space Science, Arts and Humanities

Appropriate for: Grade 3 - 5, Grade 6 - 8, Grade 9 - 12

Mission Bravo: Programming

Programming is a necessary skill for many job fields today. In this lesson, students will have hands-on experience programming a raspberry pi, sphero, or EV3 and the satisfaction that comes from seeing technology immediately respond to their commands.

Meets Colorado State Academic Standards for: K-12, Space Science, Arts and Humanities

Appropriate for: Grades 6-8, 9-12



DISCOVER MARS ENCOUNTER 1 FIELD TRIP:

Mars Robotics Encounter 1

The Mars Robotics Laboratory uses LEGO® NXT equipment and MINDSTORMS® software to simulate lifelike Mars rover encounters:

Robotics Exploration Mission

Students engaging in this mission will work in teams to complete mission objectives programming and operating LEGO NXT robots on the world's largest education-purposed simulated Martian terrain. These missions will improve students' teamwork, communication and problem solving skills as well as enhance math, technology and engineering proficiency.

Appropriate for: Grades 3 - adult