GLOSSARY:

Delta-V: A scalar which takes units of speed that measures the amount of “effort” needed to carry out an orbital maneuver.

Geostationary orbit: GEO is a special case of geosynchronous orbit where the satellites stay at an absolutely fixed point relative to the Earth’s surface at all times.

Gravity turn: A spacecraft maneuver where the craft rolls over due to the rocket engines shifting slightly to direct thrust to one side.

In-situ resource utilization: The production of useful materials from the resources available at a given location.

Low Earth orbit: An orbit within the locus extending from the Earth’s surface up to an altitude of approximately 2,000km.

Orbital spaceflight: A spaceflight in which a spacecraft is placed on a trajectory where it could remain in space for at least one orbit of the Earth.

Sub-orbital spaceflight: When a spacecraft reaches space and then returns to the atmosphere after following a (primarily) ballistic trajectory.

Zero-G: The condition of real or apparent weightlessness occurring when any gravitational forces acting on a body meet with no resistance so the body is allowed to accelerate freely.

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Teachers Guide

SYNOPSIS:

The role of getting people, satellites and other instruments into space is falling to private companies, especially with the retirement of NASA's space shuttle fleet in 2011. Reaching an altitude of 100 kilometers is required to be considered spaceflight. There have been just over 500 people that have reached this mark and only 24 have traveled beyond low Earth orbit. It is projected that within ten years, the number of people who will have flown into space will increase by about 600 percent due to the increasing market of sub-orbital spaceflight and the possibility of private citizens utilizing space flight. This program explains sub-orbital and orbital spaceflight and the requirements for vehicles to complete these journeys. With a behind the scenes look at many of the private companies involved in taking on the tasks to travel to low Earth orbit and beyond, this program uncovers some of the technology used to accomplish these goals.

CURRICULUM UNITS:

- Chemistry
- Engineering
- Physical Science
- Physics

CAREER OPPORTUNITIES:

- Aeronautical Engineer
- Chemist
- Computer Scientist
- Electrical Engineer
- Mechanical Engineer
- Physicist

PROGRAM OVERVIEW:

This program explains sub-orbital and orbital spaceflight and the requirements for vehicles to complete these journeys. With a behind the scenes look at many of the private companies involved in taking on the tasks to travel to low Earth orbit and beyond, this program uncovers some of the technology used to accomplish these goals.

ISSUES & CRITICAL THINKING:

1. Discuss the requirements of vehicles designed for sub-orbital spaceflight, orbital spaceflight and long distance rockets that will go to the Moon and beyond.

2. Examine how the history of spaceflight has influenced ideas for future space endeavors?

3. Design a plan for the efficient use of an orbital spaceport.

4. As students to research the technology that was used in the rockets in the first U.S. mission to the moon. Discuss how technology has evolved and what we might see in the future to improve long distance learning.