



Charon Challenge Introduction

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Section 1 – Introduction

1.1 – Overview

This section provides background for the CREATE Junior game called *Charon Challenge*. This competition is for students primarily in the 4th and 5th grades. Students as old as 6th grade are allowed to participate as well as younger students who are ready for this level of engineering challenge.

1.2 – Introduction

In the far reaches of our solar system is a moon. A moon that orbits Pluto. This is Charon. It was discovered in 1978 by two American Astronomers. Most planetary scientists refer to Pluto-Charon as a double, or binary planet. For more information visit:

<http://teacherlink.ed.usu.edu/tlnasa/OtherPRINT/Lithographs/Pluto.and.Charon.1997.pdf>
and

<http://solarsystem.nasa.gov/planets/profile.cfm?Object=Pluto>

Text in BLUE is supplemental Information for Science Educational Purposes.

The CREATE Foundation is pleased to announce the creation of the CREATE Kuiper Belt Initiative (KBI). The Kuiper Belt is a disc-shaped region of icy objects beyond the orbit of Neptune -- billions of kilometers from our sun. Pluto and Eris are the best known of these icy worlds. There may be hundreds more of these ice dwarfs out there. The Kuiper Belt and even more distant Oort Cloud are believed to be the home of comets that orbit our sun.

CREATE KBI needs your help to study one of the moons of the dwarf planet Pluto. The moon is called Charon. It is the largest of Pluto's five moons (Charon, Nix, Hydra, Kerberos, and Styx) In fact, it is so large in comparison to Pluto that some astronomers consider Pluto and Charon to be a double, or binary planetoid.

Charon was discovered in 1978 when sharp-eyed astronomer James Christy noticed images of Pluto were strangely elongated. The blob seemed to move around Pluto. The direction of elongation cycled back and forth over 6.39 days - Pluto's rotation period. Searching through their archives of Pluto images taken years before, Christy found more cases where Pluto appeared elongated. Additional images confirmed he had discovered the first known moon of Pluto.

Charon's orbit around Pluto takes 6.4 Earth days, and one Pluto rotation (a Pluto day) takes 6.4 Earth days. Charon neither rises nor sets, but hovers over the same spot on Pluto's surface, and the same side of Charon always faces Pluto -- this is called tidal locking. Compared with most of the planets and moons, the Pluto-Charon system is tipped on its side, like Uranus. Pluto's rotation is retrograde: it rotates backwards, from east to west (Uranus and Venus also have retrograde rotations).

NASA launched a spacecraft called New Horizons in 2006 that will visit Pluto. It will arrive in 2015.

CREATE hopes to soon launch a spacecraft to Charon. You have the opportunity to help CREATE simulate that mission.

Lab Analysis sites are already in place on the simulated Charon surface. Your mission is to land your Charon Explorer Robot near the analysis sites and work with a partner Robot to move rocks, boulders, and a meteorite onto these sites, remove the meteorite from the volcano, and to be parked on the launching pad area when the launch countdown clock reaches zero. You must also know some things about Charon and Pluto for the Mission Interview.

On the following pages are all the rules of this fast paced challenge. Your team will have the challenge of designing, building and testing your own robot to push, lift and drive beyond the competition. Good Luck and

prepare for Launch!