

Trilateration Ropes

Instructor Guide

1 Objective

This activity will help student's understand how the SPHERES satellite knows where it is, in addition to some of the basic concepts behind trilateration.

2 Materials

- Rope pieces of various sizes
- Enthusiasm

3 Activity

- Arrange students into groups of 5.
- Hand each group 4 pieces of rope. Designate the person without rope as the satellite. Make sure that the satellites know that it is their job to find all the places where they can keep the ropes tight by moving around as much as possible while holding the ropes.
- Make sure each group is in a space they can spread out in. Then have the satellite grab the first rope. Allow the satellites to move around a bit, and then call Freeze!
- Have the second person with rope hand one end to the frozen satellite, and then walk away until the rope is taut. Then begin again
- Repeat the above steps until all the ropes are being held by the satellite and they can't move. Then designate someone new as the satellite and repeat the process (it may be helpful to count off before the activity begins). Make sure each student gets a turn being the satellite.
- If things work out correctly, with one rope, the student should find a "sphere"- running around in a circle, and being able to crouch and stand on tippy toes, etc. With two ropes it should be a circle, which might be vertical (that involves crouching and tip toeing again). The third rope should change it to two spots. The final rope should make the satellite immovable.
- After all students have had a turn, consider drawing diagrams of trilateration on the board if there still seems to be a lack of understanding.