



**The Game:** Cosmic Collision, a robotics competition for students in 6<sup>th</sup> grade and younger, is played on the field shown above which is approximately 8' x 8'. Alliances, made up of four randomly paired teams, collaborate to score as many points as possible. Matches are 1:30 (one minute and thirty seconds) in length. The controller of the robot must be passed from one driver to the other between thirty (30) and sixty (60) seconds within a match.

The object of the competition is to attain a higher combined score than all the other teams. Points are scored by moving space debris to the black hole, helping the Chang'e 4 lander get to the dark side of the moon and the Chang'e 4 relay spacecraft get into lunar orbit, docking NASA's resupply rocket with the ISS (International Space Station), and giving the Space X rocket a boost to escape the gravity pull of the black hole and get it headed toward Mars. Bonus points are awarded for; properly positioning both Chang'e 4's spacecraft, and for each robot to pass close by the black hole and leave the solar system causing the black hole to follow, saving earth, and scoring big points!

**The Details:** There are a total of twenty(20) pieces of space debris, two Chang'e 4 spacecraft, one Space X Spaceship, and one NASA rocket. Each piece of space debris moved to the black hole will score 5 points. Bonus points will be awarded as follows: a) Docking NASA's rocket with the ISS - twenty (20) points; b) Getting either of the two Chang'e 4 spacecraft into their proper orbits/position - ten (10) points; c) Second Chang'e 4 spacecraft positioned in

the proper orbits - twenty (20) points; d) Pushing the Space X Spacecraft away from the black hole and toward Mars - twenty-five (25) points; e) For each robot that leaves the solar system (field of play) at the designated coordinates the following points are earned - 1<sup>st</sup> - five (5), 2<sup>nd</sup> - five (5), 3<sup>rd</sup> - ten (10), 4<sup>th</sup> - twenty (20) points; f) Returning Earth to it's proper orbit - ten (10) points; g) Returning the moon close to its proper orbit - ten (10) points; and h) Returning the moon to it's exact proper position twenty (20) points.

Robots are placed, 1 touching the perimeter and earth orbit, 1 touching the perimeter and the moon orbit, 1 touching the wormhole, and 1 touching both perimeters of the corner across from the wormhole, to start the match.

Each robot (no larger than 14" x 14" x 14" to start) will collaborate within its Alliance in order to maximize its score. The breakdown of the scoring can be seen below.

### Scoring

Object	Goal	Score
Space Debris	In Black Hole	5 per piece
Chang'e 4 Spacecraft	Back in orbit	10
Chang'e 4 Spacecraft	Both back in orbit	20
Earth	Back in orbit	10
Moon	Nearly back in orbit	10
Moon	Exactly back in orbit	20
NASA's Rocket	Docked with ISS	20
Space X Spacecraft	Free of Black Hole	25
Robots	Exit solar system before time expires.	5-1 <sup>st</sup> robot 5-2 <sup>nd</sup> robot 10-3 <sup>rd</sup> robot 20-4 <sup>th</sup> robot