

HOVERCRAFT

Objective: Prior to competition, students will design, build, and learn to operate a hovercraft that will be subjected to several obstacles and will be able to remove a specified weight in the shape of a cow towards the end of competition.

A Team Of Up To: 2 students

Time: Approximately 30 minutes

Impound: Yes

Materials: Safety Goggles

Guidelines to Construction:

1. All hovercrafts must fit inside a circle 33 inches in diameter.
2. All materials, except for blow dryers, leaf blowers, and fans, may be used. Parts of the items listed may be used but must be modified in a way you can demonstrate to the event supervisor.
3. All devices must be remote controlled. You must demonstrate to the event supervisors how to move left, right, up, down, forward, and backward with the use of the remote controls during impound.
4. The device must be able to hover above the ground at a minimum of 8 inches. Points will be deducted by every half an inch if it does not meet this requirement.
5. A magnet must be attached to the bottom of the device to where it can pick up a cow figurine with a magnet on its back. The device must be designed where you can pick up things with the magnet and so that you can drop what you picked up. The weight and size of the cow will be specified at impound. (It is best to have many different sizes of magnets on hand to be sure that you have a magnet powerful enough to pick up the cow.)

Competition:

1. The competition will consist of 10 obstacles that your device will have to maneuver itself through in a maximum of 450 seconds. Obstacles will not be known till impound. Teams will be given a 10-minute time period before testing to observe the obstacles.
2. Obstacles may include but are not limited to the following:
 - a. Pushing a golf ball in to a hole
 - b. Maneuvering around a set of cones
 - c. Picking up magnetized letters to spell a word
 - d. Pushing a ball down a ramp to hit a switch that turns on a light
 - e. Hovering over sand hills
 - f. Making sets of pinwheels spin
 - g. Hovering over water
 - h. Passing through a course of swinging objects without being hit
 - i. Pushing dice off a small cliff till you roll snake eyes (second team member or judge will replace dice with each try)
 - j. Knocking over a set of dominos
 - k. Going over blocks of varying heights with out knocking them over

These will **NOT** be the only tasks used. These are only examples. Event supervisors will create their own obstacles if they wish. Obstacles will be in order from easiest to hardest the last obstacle (task 10) will be the hardest task to perform according to the event supervisor.

3. After all obstacles have been passed the device must use its attached magnet to pick up the magnet cow and then land in a designated area that will be labeled with a sign that says "The Mother Ship".
4. At **NO TIME** may the team touch their device while in the 450-second competition time. Touching the device will result in a 50-point deduction for each touch.

5. Partial points will be given for each failed attempt at an obstacle depending on what occurred in the obstacle. Before attempting an obstacle a team may decide to pass it. If they choose to they will not receive partial points and will have points deducted.
6. Only when a team passes an obstacle may they touch their device so that they can transport it to the next obstacle.
7. A team may only pass two obstacles. They may not pass the last two obstacles before the “abduction” of the cow. Those two must be attempted and the last must be successful.

Scoring: 1. **Timing:** begin with 450 points. For every second it takes to complete the obstacles and “abduction task” one point will be removed. 2. **Tasks:** To receive **full** points the task **must be** successful. Partial points **will not** be given for 9th and 10th task. They must be successful and **may not** be passed.

1st task- 50 points (partial points can be no more than 25 points)

2nd task- 55 points (partial points no more than 25)

3rd task- 60 points (partial points no more than 20)

4th task- 60 points (partial points no more than 20)

5th task- 70 points (partial points no more than 20)

6th task- 80 points (partial points no more than 20)

7th task- 85 points (partial points no more than 20)

8th task- 90 points (partial points no more than 15)

9th task- 100 points (no partial points, may not be passed, must be successful)

10th task- 150 points (no partial points, may not be passed, must be successful)

ABDUCTION TASK: 200 points

TASK POINTS POSSIBLE: 1000 points

3. **Hovering:** For each half of an inch under 8 inches that the device hovers 20 points will be deducted (If the device only hovers 4 inches above the ground then 160 points will be deducted.) Teams will receive 50 points for meeting the 8-inch requirement.

4. **Touches:** For every touch after the 450-second testing period begins 50 points will be deducted unless it is an authorized touch when a team chooses to pass an obstacle.

5. **Passes:** Any time a team chooses to pass an obstacle (which they may only do so twice) 75 points will be deducted from the teams final score.

6. Not meeting the Guidelines to construction will result in disqualification from the tournament. The only rule that will not result in a DQ is the hovering rule where points will just be deducted as stated above.

7. The team with the highest amount of points will be ranked highest but all teams that passed 2 obstacles or failed to complete the abduction task within the time limit will be ranked below everyone else.

8. **BONUS:** After the abduction task has been completed team members may choose to go on to a bonus obstacle where their device must be able to pass over a height of 3-5 feet to knock a magnetized ball off a ramp to fall into a hole. Then the device must retrieve the ball, drop it into a tunnel where the ball will hit a light switch that will turn on a light bulb that will indicate they have received bonus points. This will give the team 100 bonus points and will allow them to replace partial points from one attempt at an obstacle of their choice with the full point value of that obstacle.

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