

Laser Pinball Challenge!

The goal is to set up the mirrors in such a way as to have the laser beam strike the target as close to the center as possible.

- 1) Time starts immediately after the rules are explained.
- 2) You may not move the laser or the target or the obstacle.
- 3) You may use the provided rulers and protractors.
- 4) You may draw on the play surface with the dry erase markers.
- 5) When you are ready to shoot, raise your hand. Time will stop and the proctor will supervise you turning the laser on and shooting the target.
- 6) Your set The penalty time from the target is added to your set up time.

The Tortoise & The Hare

Your goal is to measure the speed of the slow (blue) car and the fast (red) car. Then using these speeds determine where they will pass (when the front bumpers line up). You will make a prediction and then test. Penalty time will be determined by how far the prediction was from the actual passing point.

When you do your official run, you will start the slow (blue) car from the slow start line and the fast (red) car from the fast start line.

- 1) Time begins at the beginning of the round.
- 2) In the testing phase you may only have one car on the floor at a time.
- 3) You may use the provided scrap paper, pencils, calculators, metersticks and stopwatch during the testing phase.
- 4) You must tape your target to the ground centered on where you think the red car will pass the blue car.
- 5) Time is up when you have the target adhered to the floor.
- 6) Team members are responsible for the simultaneous start of each car.

Fermi Questions

The goal is to answer all of the questions to the nearest power of ten as accurately as possible and as quickly as possible. For example, if you think the answer to a question is .00034, the nearest power of ten is 0.0001 so you should write 10^{-4} or just a "-4" in the blank. If you think the answer is 700, the nearest power of 10 is 1000 so you should write 10^3 or "3" in the blank.

Rules

- 1) Time begins when you are asked to turn over the question sheet.
- 2) You may use the whiteboard and markers provided, but you are not required to. No Calculators are allowed.
- 3) The answer to each question should be reported as a power of 10.
- 4) Time is up when you turn your score card with your answers in to the proctor at this station.

Scoring: You are penalized one minute for every power of ten your answer is from the correct answer. For example if the accepted power of ten answer to a question is 5 and your answer is 5 in the blank you accumulate no penalty time. If the accepted power of ten answer to a question is 5 and your answer is 7, then your team is penalized 2 minutes.

Bowling Ball Challenge

The goal is to get the ball from the start line, around the bottle markers and back to the start line as quickly as possible, while hitting the ball as few times as possible. Each team member gets one mallet. You must switch hitters for each hit - the same person can't hit the ball twice in a row.

- 1) Time for each trial begins when the first mallet strikes the ball.
- 2) Time for each round ends when the ball crosses the finish line.
- 3) Any time a bottle falls over, whether due to the ball, a mallet or a body part, a penalty is assessed.
- 4) Each hit of the ball must be a deliberate, sharp, quick contact. Any time that the same team member hits the ball multiple times in succession, or pushes or drags the ball, a penalty is assessed.

Penalty seconds will be calculated as following:

Legal hits = 5 seconds

Illegal hits and Bottle hits = 20 seconds

Total time = Actual time + penalty time