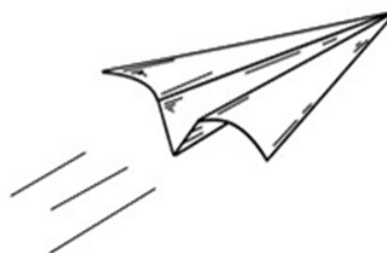
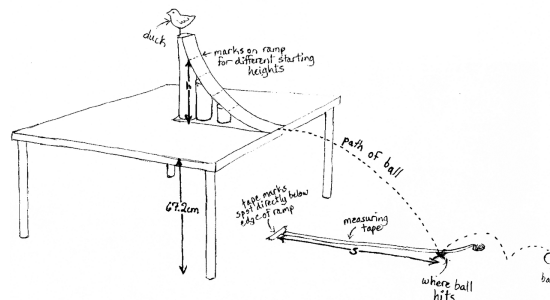
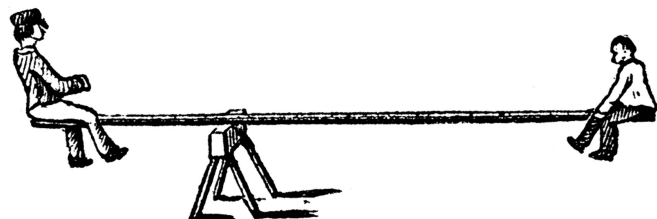


Thirty-Seventh Annual PHYSICS OLYMPICS



Thursday, March 16, 2023

8:30 AM - 1:00 PM

Farmingdale State College

Lupton Hall

Sponsored by **Long Island Physics Teachers Association**

Hosted by Farmingdale State College

Registration for 2023 Physics Olympics

Registration:

- Register your 5-student team at www.lipta.org.
- A maximum of 5 students may attend. Spectators are not allowed.
- Each advisor and student participant must turn in a **signed** Photo Release form upon arrival to the event.

Confirmation:

- You will receive a confirmation email after you successfully register.
- Check www.lipta.org to make sure that you are on the official list of participants **before the event**.

Registration deadline: March 9, 2023. Only teams registered by this date may participate. There is a maximum of 18 teams, so register early!

Please enter the names of expected participants by March 9, 2023 at www.lipta.org.

Fee for the Physics Olympics:

Members	\$125*
Non-members	\$140* (includes one year membership)
	*includes 2 pizzas and soda

Send a check or PO to our address: **LIPTA**
419 Renee Drive
Bayport, NY 11705

Or pay online by credit card or Paypal at www.lipta.org
Need an invoice? Email us a request at treasurer@lipta.org

Physics Olympics schedule:

Date: **Thursday**, March 16, 2023

Place: Farmingdale State College, Lupton Hall, 2350 Broadhollow Road Farmingdale, NY 11735

Registration: 8:30 a.m.

Event Start time: 9:00 a.m.

Awards: 12:45 p.m.

Text Justin King at 631-241-5404 or email king@lipta.org for more information.

The Rules

The events for the 2023 Physics Olympics are:

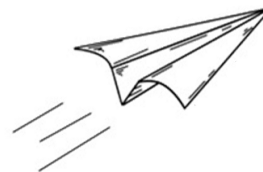
The Physics Bowl



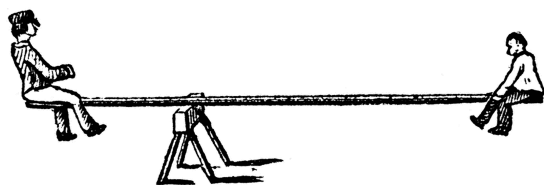
Fermi Questions



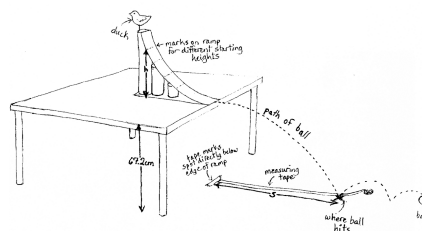
On the Glidepath



Something to Torque About



Precisely Predicting Projectiles



1. Each school may send a single team of no more than 5 students. Additional students and spectators cannot be accommodated. Violation of this rule will result in disqualification of the team.
2. All participants and advisors must turn in a signed photo release form, copy enclosed.
3. Each team must have a faculty advisor. Faculty advisors will judge the events. At least two judges will judge each event. Judges will not evaluate their own school's team.
4. Each event is timed. Teams late for an event will forfeit that event.
5. Teams should bring scientific or graphing calculators for the Physics Bowl, and are encouraged to wear team T-shirts. Equipment, including calculators, for other events are limited to what is provided by the judges at each event, as outlined in these rules.
6. Accessing the internet is prohibited during competition; students are not allowed to use phones during events.
7. For each event, the total number of points for 1st place will equal the number of teams present. For example, if there are 16 teams competing:

1st place = 16 points

2nd place = 15 points

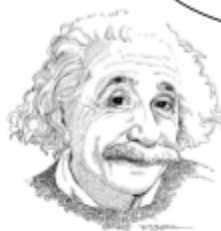
3rd place = 14 points

The last place team will score 1 point. Tying teams will split points equally for the places in question.

8. If two teams tie in overall points, their placement in the Physics Bowl will be the tiebreaker for overall standing.
9. Trophies will be awarded to the top three teams in each event and to the four teams that accumulate the most points overall.
10. A certificate will be awarded to the team with the best physics T-shirts, as determined by the judging panel of experts. The T-shirt award will *not* count towards the overall trophy.
11. All judges' decisions regarding events are final. The wording of each challenge in this year's event book has been carefully prepared to define each task as precisely as possible. It is expected that all participants will produce solutions which comply with the task as defined. Normal physical interpretations will be applied to all the terminology used in defining the tasks. Those solutions which, in the opinion of the judges, do not comply with the spirit or intent of the event will be disqualified. General questions regarding the events may be directed to the coordinators of the Physics Olympics. The coordinators will accept inquiries that may help them to prepare for unusually good solutions to the problem.
12. Students are required to remain with their team and in the designated areas at all times.
13. Any concerns regarding inappropriate behavior and/or conduct, including any form of harassment, must be brought to the attention of a LIPTA exec board member. Members will be present at the Physics Olympics or may be contacted at exec@lipta.org.
14. Text or email Justin King at 631-241-5404 or king@lipta.org if you have any questions.

The Schedule

1. Events begin at 9:00 a.m.
2. If you are driving your own vehicle, contact Justin King to obtain a parking pass. Park in Student Lot #9, across the Great Lawn from Lupton Hall. Look for LIPTA signage.
3. Teams may pick up their materials between 8:30 and 9:00 a.m.
4. Team registration includes lunch (2 pizzas + soda).
5. Morning refreshments and lunch will be provided to faculty and students.
6. Trophies will be awarded at 12:45 p.m.



If only they had this when I was in school.

Photo Release Form

Physics Olympics

This signed document grants permission for photographs during the Physics Olympics event to be used by Long Island Physics Teachers Association (LIPTA) for publication on the LIPTA website, videos or newspaper.

School name: _____

Participant (print)

Signature

Date

Parent/guardian name
if participant is under 18 yrs

Signature

Date

★ 1 signed photo release form is required for each participating student and faculty advisor.

Duplicate for each participant (5 students and faculty advisor)
Additional forms can be obtained at www.lipta.org

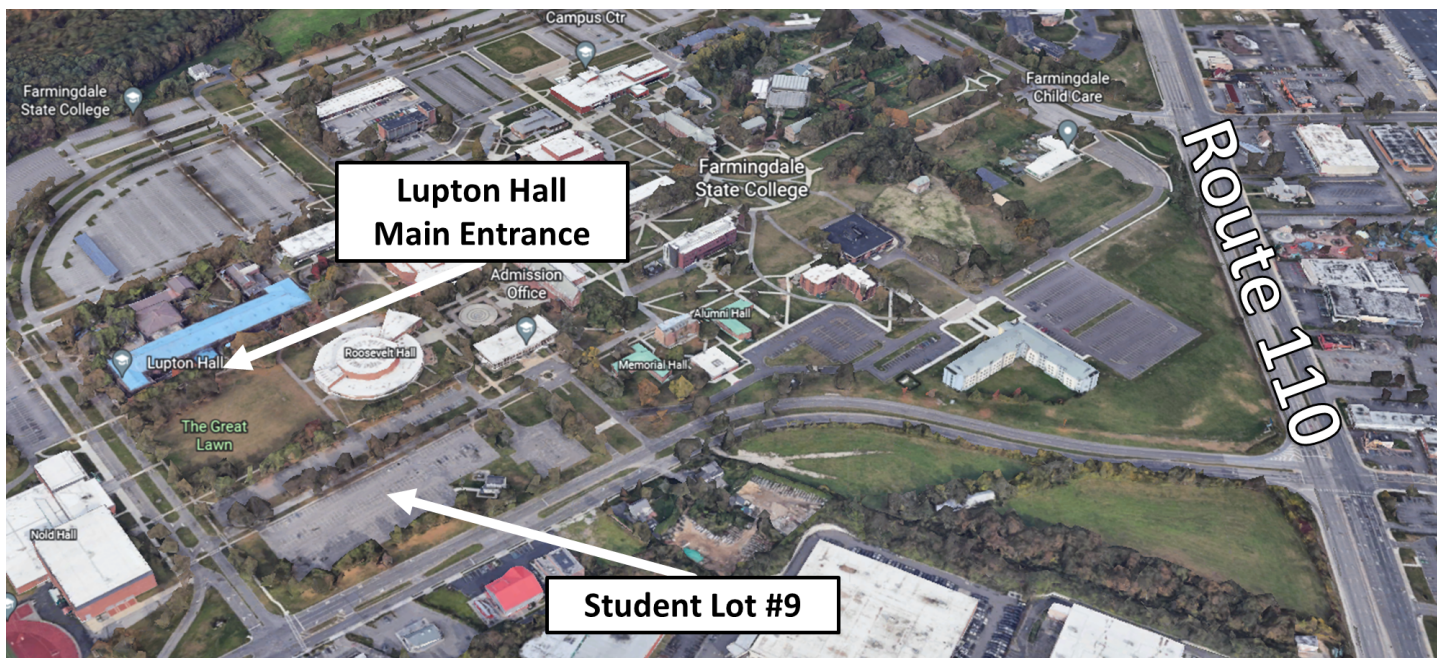
T-shirt Contest

Do you have a phlair for physics phashion? Show us your finest at the LI Physics Olympics. Our panel of experts will recognize, with a certificate, the team with the best physics T-shirts!



- Judging will be based solely on physics content; professional printing is not necessary.
- For a team to qualify for this contest, the team's t-shirts must all have the same design.

Farmingdale State College



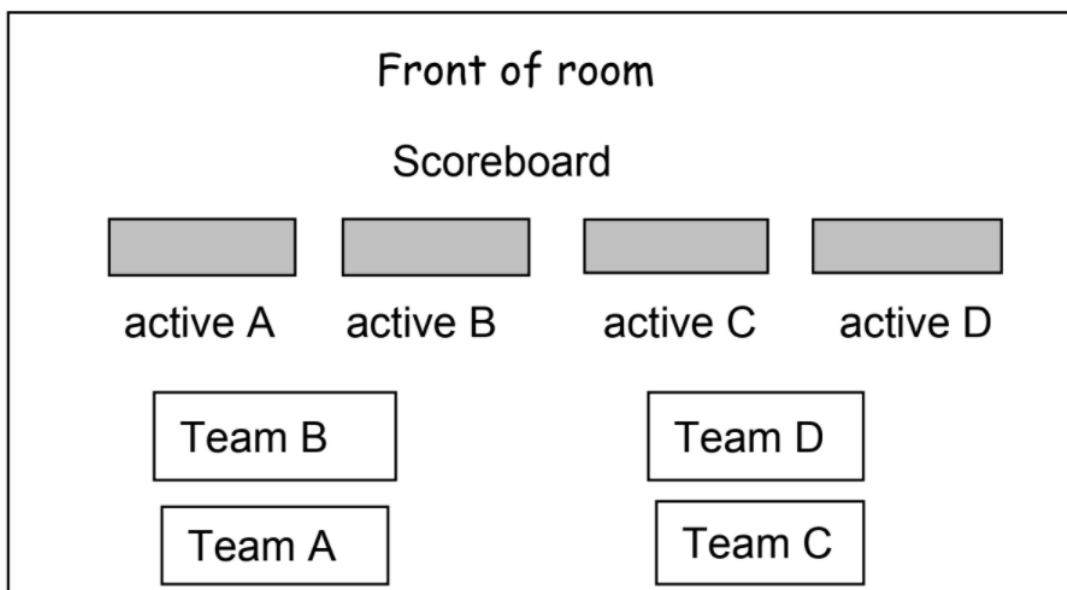
Physics Bowl

Objective:

To be the first team to score twenty points. First round winners will compete in the trophy round.

Rules:

1. All members of the team will participate. Three of the five members will be designated to rotate into the “active player” seat.
2. All questions will be multiple choice and based on the Regents Physics core mechanics syllabus. In the trophy round some questions will be at the honors level. Regents reference tables and paper will be provided. Scientific or graphing calculators may be brought and used.
3. One member of each team, the “active player”, will sit at the shaded location, facing away from teammates. (See diagram)
4. The first team’s “active player” to turn on the light will earn one point for the correct answer or lose two points for a wrong answer.
5. The teammates of the “active player” who answers correctly will have the right to try for a bonus point. To earn a bonus points, the remaining team members must answer the question correctly without help from the active player. Only one person may speak for the team. There is no penalty for an incorrect answer.
6. After each question, one of the three designated “active players” will rotate into the shaded location and will become the “active player” for the round.
7. The first team to reach twenty points will advance to the trophy round.



Fermi Questions



Objective:

To estimate quantities which are either difficult or impossible to measure directly.

Rules:

1. Each team will be provided with a list of Fermi questions.

An example of a Fermi question is:

How many drops of water are there in the Long Island Sound?

2. Answers are to be given to the nearest order of magnitude.

Example: Acceptable answer: 10^3

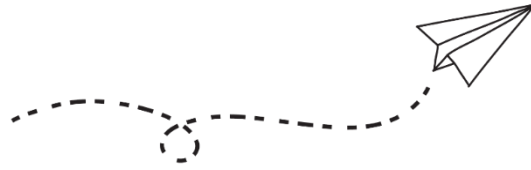
Unacceptable answer: 2×10^3

3. One point will be deducted for each answer which is not in acceptable form.
4. Questions must be answered in the allowed time.
5. Only one set of answers may be submitted by a team.
6. Calculators and other electronic devices are not permitted.
7. Reference materials are not permitted.
8. No work needs to be shown.
9. Each answer which agrees with the accepted answer will be awarded 10 points. One point will be subtracted for each order of magnitude different from the accepted value, to a minimum of 0 points.

Tiebreaker: The time to complete the event will serve as a tiebreaker.

Time limit: 15 minutes.

On the Glidepath



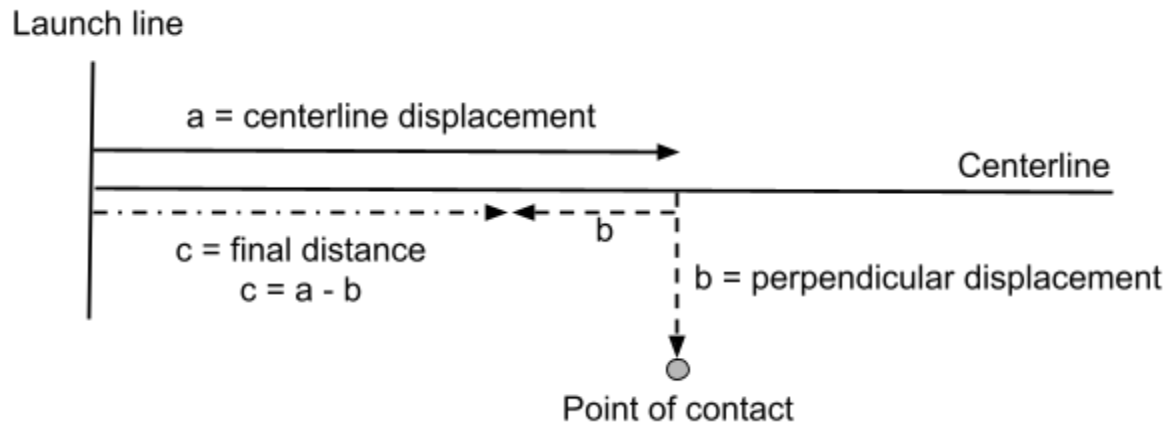
Objective:

To construct a paper airplane that team members will throw to achieve the maximum travel distance measured from a centerline marker.

Rules:

1. Each team will receive three sheets of standard 20 lb., 8.5 x 11, white copy paper; three standard smooth #1 paper clips (1 and 3/8 inches in length); and a pair of scissors. Using these materials, the team may construct up to three paper airplanes consisting of one piece of paper each. A paper sheet may be modified only by folding, cutting, or tearing. The entire sheet must be used. No gluing, taping, or stapling is allowed. The paper clips are provided for ballast, and only ONE paper clip per airplane may be attached at the team's discretion. Note, the airplane must have wings. Any attempt to merely crumple up and throw the paper will result in disqualification with zero points awarded to the team.
2. Teams will have a maximum of 10 minutes to construct their airplanes and practice with them. At the end of this time, ONE airplane will be chosen by the team for competition. Teams are advised to research construction of airplane designs and practice making and flying them before the day of competition.
3. Each team will get three trials with a different member throwing the airplane on each trial. The best trial will constitute the team's final score. Minor adjustments may be made to the airplane between trials to smooth out the surfaces, modify flight characteristics, or move the paper clip.
4. The airplane will be launched by one person standing behind the launch line marked on the floor of the hallway.
5. A centerline will be marked off in the middle of the hallway at right angles to the launch line. The flight goal is twofold: achieve the greatest distance from the launch line while coming closest to the centerline.
6. A trial ends when the plane hits the floor, a wall, or the ceiling. The distance will be measured from the point of initial contact as determined by the judges, not where the airplane comes to rest. Any trial that hits the ceiling will be considered out of bounds and will NOT be scored. There are NO "do-overs".

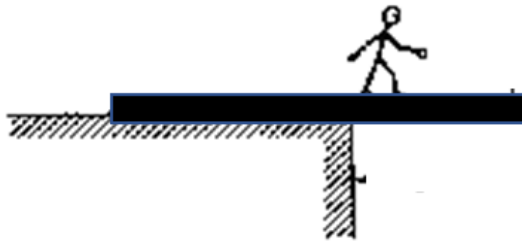
- The score for a trial will be determined by first measuring the displacement component from the launch line along the centerline even with the point of contact. From this location, the perpendicular displacement to the point of contact will be measured. The perpendicular displacement will be subtracted from the centerline displacement to calculate the final distance score.
- Teams will be ranked in order of decreasing final distance score for their best trial.



Tiebreakers: In the event of identical final distance scores, the team with the lower perpendicular displacement will be considered the winner. If teams are still tied, the second-best final distances will be compared with the better score being the winner.

Time limits: 10 minutes for construction and practice; 5 minutes for 3 trials.

Something to Torque About



Objective:

To determine the mass of an altered meter stick using torque.

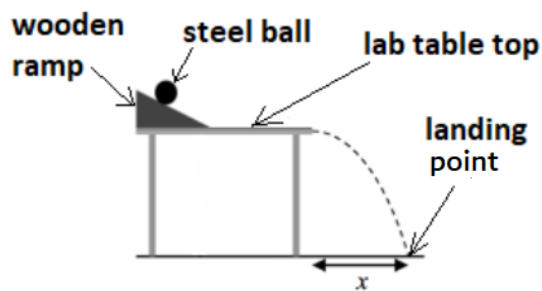
Rules:

1. The timer begins when the team receives its final instructions. Teams are given an altered meter stick, scientific calculator, known mass and scoresheet.
2. The team will use a table to act as a fulcrum to balance the meterstick.
3. Using the principle of torque, the team will determine the mass of the meterstick to the nearest ten-thousandth of a kilogram.
4. Teams will be required to hand in the scoresheet which must include calculations and/or explanations that were used.
5. The timer stops when the team hands in the scoresheet paper.
6. The score will be based on the team's percentage of error with the known mass. Teams that show no appropriate work on their worksheet will be ranked below all other teams and will tie for last place.

Tiebreaker: The shortest time will serve as a tiebreaker.

Time limit: 15 minutes.

Precisely Predicting Projectiles



Objective:

To predict where a steel ball that is rolled down a ramp, across a lab table, and off the edge will land on the floor.

Rules:

1. Time begins when a team is given their materials. Each team will be given a steel ball, wooden ramp, meter stick, stopwatch, plumb bob, masking tape, and a printed target.
2. The team will decide where on the table to place the ramp, keeping in mind that the ball must roll some distance across the table before becoming a projectile. The ramp may be taped to the table.
3. The team may make measurements of the ball, its motion, the ramp, and the table.
4. Teams may **NOT** allow the ball to roll off the table and hit the floor while they measure. Teams shouldn't be solving this problem through trial and error, and judges have the authority to disqualify a team they deem to be violating the spirit of the event.
5. The meter stick, stopwatch, and plumb bob may only be used for measurement. For instance, the meter stick can not be used to guide the motion of the ball on the table.
6. When teams are done with measurements and calculations, they will tape the printed target on the floor with the bullseye at the location they predict the ball will make first impact.
7. Time stops once the target is taped to the floor.
8. A judge will place a sheet of carbon paper over the target. The team will be given *only one attempt* to roll the ball down the ramp, across the table, and over the edge to hit the target.
9. However, if the team doesn't like "the look" of the ball's path across the table, they can stop the ball **before** it reaches the edge (before it becomes a projectile), and they may release it again. Teams can only stop and re-release the ball twice.
10. The team's final score will be the distance, in millimeters, between the center of the bullseye and the center of the mark left by carbon paper, as measured by the judges. Any teams that fail to hit the printed target will be tied for last place.
11. Teams will be ranked in order of increasing final score.

Tiebreaker: The shortest time will serve as a tiebreaker.

Time limit: 15 minutes.