

43rd Annual Physics Field Day
 Presented by Creighton University's Society of Physics Students
 Saturday, March 19, 2016
 "Nobel Laureates in Physics"

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Greetings!

You are invited to the Creighton University Physics Department's Physics Field Day 2016! On Saturday, March 19, you and your team of high school physics students will duke it out with other local high schools for the title of "Field Day Champion." This year's theme is "Nobel Laureates in Physics," where we will explore the work of notable physicists and the impact they have made on our society.

If you have any questions, please email SPS President, Danielle Desa (danielledesa@creighton.edu). Additional details and updates on Physics Field Day can always be found online at:

<http://physicsweb.creighton.edu/content/field-day-hallfame>

We look forward to seeing you this spring!
 Creighton University SPS Members

Registration Cost: The registration fee is \$15 per team plus \$3 per person, with 2-5 individuals per team. Breakfast and lunch will be provided for both teachers and students.

To register: please email the following information to danielledesa@creighton.edu:

1. School Name
2. Advisor's Name
3. Number of Teams

You may also mail the information to:
 Patricia Soto
 Department of Physics
 2500 California Plaza
 Omaha, NE 68178

Or fax it to (402) 280-2140.

We request your registration information by March 5, 2016. Upon receiving your information, you will receive a Nobel Laureate's name, which will serve as your Chalk Talk topic and team name.

Events

Chalk Talk

Topic: Nobel Laureates

Purpose: In accordance with the theme of Field Day, each team will be assigned the name of a Nobel laureate in physics: (Planck, Hertz, Pauli, etc.). This topic will also be the subject of the Chalk Talk from the representative of each team. Please incorporate the work they did and their contributions to physics rather than a biography. While in-depth knowledge about advanced physics topics is not expected, presentation of concepts or mathematics (well known phenomena, equations, constants) is encouraged.

I. Procedure:

- One contestant per team.
- Each contestant is allowed to bring no more than two five-by-seven inch notecards.
- The contestant will present his/her talk to three judges. The room will be open to teachers and students who are not giving a talk.
- The speaker will be given no more than five minutes to present his/her talk. The judges will give the speaker a warning at four minutes in order to let the speaker finish within the time limit. The speaker will not be allowed to continue after five minutes have expired.

II. Judging:

- **Delivery:** The contestant should use smooth, concise English and maintain eye contact with the judges. A contestant's poise during his/her presentation is part of the judging criteria.
- During talk itself, the following will be considered:
 - i. The amount of material covered.
 - ii. The logical flow of ideas.
 - iii. The quality of material covered.
 - iv. The creativity of the talk.

III. Questioning:

- After the talk the judges will take five minutes to ask the contestant relevant questions pertaining to the topic. The speaker's answers will be judged on the following criteria:
 - i. The accuracy of the answer.
 - ii. The relevance of the answer to the question.
 - iii. The ability to think about unfamiliar topics.
 - iv. Originality.

Optics Sprint

Purpose: This event will consist of two optics tests based on Snell's Law and the Thin Lens Equation.

- I. Team: Each team will consist of two or three members, but everyone must participate at least once.
- II. Rules: Upon arrival, contestants can pick which test to complete first. The second test cannot be started until the first is complete.
- III. Equipment: Teams may bring in relevant texts, tables, and calculators. Optical elements, meter sticks, and paper will be provided.

Egg Drop

Purpose: Build a structure capable of containing and protecting an egg from a one, two, or three story drop.

- I. Teams: Each team will consist of two to five individuals.
- II. Rules:
 - The structure must consist of only the materials provided.
 - The structure must be capable of being loaded by the judges prior to the drop and checked without being dismantled after.
 - Teams will drop from one story and eggs will be checked. Those that survive the first drop will proceed to two stories and, similarly, to the third floor.
 - Each team will have limited time to complete the structure. After this time is finished, the team may not touch or alter their structure in any way.

Quiz Bowl

Multiple choice and free response style. Expect questions related the basic physics and history of our theme!

- I. Teams: Each team will consist of three individuals.
- II. The Game: Depending on attendance, the rounds will consist of two or four teams. The game is comprised of three rounds.
 - The first round will have 10 questions worth 25 points each. There will be an 8 second time limit to buzz in and a 5 second time limit to answer.
 - The second round will have 4 questions worth 50 points each. There will be a 15 second time limit to buzz in and a 5 second time limit to answer.
 - The third round will have questions worth 100 points. Each team will have 2 minutes to work a problem and write down an answer. More than one team can score on the last question. The round will be continued until there is a winner.
 - Each team should have one designated captain who will give the answers.
- III. Equipment:
 - Students may not bring anything into the exam except a non-programmable calculator. Pens, scratch paper, and some relevant equations will be provided.
 - Books or notes are not permitted!

IV. Scoring: There will be a penalty of 10 points for a wrong answer in round one, and 20 points for wrong answers in round two. There will be no penalty for wrong answers in round three.

Circuit Challenge

Purpose: Using the basic principles of electronics, participants will use the circuit elements provided to light up as many LEDs as possible.

I. Team: Each team will consist of two or three members.

II. Rules:

- Each team will set up the circuit elements without electricity during the setup process.
- The team will have two wildcards, in which the moderator will connect the circuit to electricity, and tell the team how many LEDs are lit. Once the team has signified that they are satisfied with the placement of all the circuit elements, the circuit will be turned on for scoring. No elements may be touched at that time.
- There will be a time limit in which to hit the target. Be ready to start on time!

III. Equipment: Teams may bring in relevant texts, tables, calculators and pencils. All circuit elements will be provided. Contestants must bring all other equipment they deem necessary.

IV. Scoring: Scoring will be based upon how many circuit elements are successfully used, the number of unused wildcards, and the number of lit LEDs.

Rube Goldberg Machine

Purpose: Rube Goldberg machines are designed to complete a simple task in a complex way. In this event, the team will use the provided equipment to build an original Rube Goldberg machine that accomplishes a given goal.

One notable example is the music video for OK Go's song "This Too Shall Pass."

<https://www.youtube.com/watch?v=qybUFnY7Y8w>

I. Team: Each team will consist of two to five members.

II. Rules:

- Each team will use the time allotted to create a Rube Goldberg machine to complete a simple task.
- Each team's machine will demonstrate angular momentum, linear momentum, kinetic energy, 2D kinematics. Each team must be able to describe how the machine demonstrates each concept.
- One person may touch the machine to start it. However, it must be able to run by itself upon start-up and no adjustments may be made after.

III. Equipment: Teams must use only materials supplied by the Creighton Physics Department.

IV. Scoring: Each team will only receive points for:

- Demonstration of basics physics concepts described above
- Completion of the simple task
- Creativity!