

Trial/Pilot Event

Contact the organizers of your tournament to find out what trial/pilot events will be held.

It's About Time

DESCRIPTION: The event consists of two parts. The first part requires the student to construct a mechanical device, prior to the tournament, that will measure time to the nearest tenth (0.1) second for time intervals between 1 and 300 seconds. The second part is a test of time, which will include questions regarding the concept of time, timekeeping, astronomy, physics, mechanics and horology.

THE COMPETITION: A TEAM OF UP TO: 2

APPROXIMATE TIME: 1 hour

1. A team must make their own timepiece. NO SCIENTIFIC APPARATUS (e.g. ring stands, burets, masses, etc.) MAY BE USED. No commercial counters or timepieces or parts of commercial counters or timepieces will be allowed. Students will construct and bring one device that measures time to the nearest tenth (0.1) second. The device may be a water or sand glass, any type of pendulum (simple or torsional), oscillating spring, or other non-electric type device.
2. Teams will be given five minutes to calibrate their device against a stopwatch or other timing device (provided by the student).
3. Teams will be given a test and an answer sheet. Questions may vary and may be multiple choice, true-false, completion, or problem solving calculation type. Point value may vary with difficulty of question. All formula, constants, or basic equations will be provided. Students may use non-programmable or programmable calculators during the written exam.
4. Each team may bring one 8.5" x 11" sheet of notes for Part 2 of the competition. When two students are competing together as a team, communication between them must be done in very quiet whispers or by pen and paper.

SCORING: Part 1 Time measuring device: Students will be given 50 points. Errors in time measurement will generate penalty points that will be subtracted from the initial 50 points. The score for this part of the event cannot go below zero, i.e. error penalty cannot be more than 10 points per trial. Teams will measure five different time intervals to the nearest tenth (0.1) second. Table 1 gives penalty points for each trial. *Table 1: Time intervals and penalty points per tenth (± 0.1) second measurement error*

<u>Time Measurement</u>	<u>Time Interval Range</u>	<u>Penalty Points ± 0.1 sec error</u>
Trial 1	5 to 30 sec	0.5pts per 0.1 sec
Trial 2	30 to 90 sec	0.2pts per 0.1 sec
Trial 3	60 to 120 sec	0.2pts per 0.1 sec
Trial 4	120 to 300 sec	0.1pts per 0.1 sec
Trial 5	any of the above	0.1pts per 0.1 sec

Part 2 Written Test: Students will be given a test and some work paper on which calculations may be preformed. The test will be worth 50 points. The total of the scores from Part 1 and Part 2 will determine the winner, i.e. the highest total will win. Ties will be broken first by the largest score from Part 1 and second by the shortest time needed to complete Part 2.

Suggestion: The events which students are asked to time in Part 1 should be such that the student can concentrate on operating and/or observing the timing device rather than the event. For example simultaneous light and sound signals indicating both the beginning and ending of the Time Interval.

Sample Questions: 1. (1 point) If the time in New York City is 9:30 AM EDT on June 21st, what is the sidereal time? 2. (2 point) In the middle 1800's no standard time zones existed. Instead, time at a given location was referenced to Greenwich England by determining the longitudinal difference between the two locations. What is the longitudinal time difference between St. Louis, Mo. (longitude 90° W approx.) and Kansas City, Mo. (longitude 94° W approx.) if 15° longitude = 1 hour. a) no difference b) 4 minutes c) 16 minutes d) 20 minutes e) none of these 3. (3 points) A Seconds Pendulum has a period of one second. If we take the period of a simple pendulum to be $2\pi \sqrt{L/g}$ and the gravitational field strength at a given location is 980 cm/sec^2 , what length pendulum is needed to be a seconds pendulum? **This event is sponsored by The National Association of Watch and Clock Collectors Inc. If Directors Supervisors or Coaches would like help from a local contact, please call 717-684-8261.**