

## **Machines (30 Minutes - Based on Team Schedule)**

**Description:** This event tests participants' knowledge of machines. This event has a written test and may/may not include "hands-on" stations.



**Participants per Team:** 2

### **Spirit of the competition:**

- It is a rules violation if coaches, parents, mentors, or spectators enter the competition area. Talking to the team members any time during the competition. Violation of this rule will place the team below all other teams.
- It is further a rules violation for a parent, mentor, or coach to research this event on behalf of the students.

**Teams need to bring:** Pencils, and the team written report. Optionally a four-function calculator.

**Safety Requirements:** None

### **The competition:**

Part 1 - Teams will submit a written report on a common household compound machine. The team report must include the school, student names, team number, and a declaration by the team that they did not have any help writing the report. With a length of no more than 3 single sided pages.

The report must include:

- The simple machines that make up the compound machine
- How it makes life easier
- A history of the machine
- A short a list of references or bibliography
- Teams may want to, but do not have to include:
  - Patent numbers and registrations
  - Information about the company that made the machine
  - Any improvements they can make to the machine

Part 2 - Teams will answer questions but not limited to what is listed below.

- Energy, force, motion, and work
- Types of simple machines
- Differences between simple and compound machines
- Identifying the simple machines within a compound machine
- Calculation of ideal and mechanical advantage, efficiency, load, and effort

### **Scoring:**

Teams will receive two weighted rankings. These rankings will be added to find the final placements. The team with the lowest sum will place first.

- 75% of team points will be awarded for each correct response on the written test.
- 25% of team points will be awarded for the team written report.
- Ties will be broken by the accuracy or quality of answers to select questions on the written test chosen by the event leader prior to the competition.

### **Scoring Example:**

Equation: (written test ranking x 0.75) + (team report x 0.25) = final ranking

- Team A ranks 3rd on the written test. This scores 2.25 ranking points. The team also scores 5th on their report. This scores 1.25 ranking points. The team's final ranking score is 3.5.
- Team B ranks 2nd on the written test. This scores 1.5 ranking points. The team also scores 7th on their report. This scores 1.75 ranking points. The team's final ranking score is 3.25.
- Team B is placed first in the rankings.

**Possible Resources:**

Division A will not release previous tests, or the exact resources used by the Event Supervisor or test writer for any events. The listed resources are meant as a starting point. It is up to the competitor to research further.

- [USPTO : United States Patent and Trademark Office](#)
- [Machines - Wiki - Scioly.org](#)