

EVENT 6: STRAW LEVER ARM

(As of 12/1/11)

OBJECTIVE: To build a lever arm, of minimal mass, constructed solely of plastic drinking straws and straight pins, that will support a 1 kg mass.

RULES:

- a. The lever arm must be brought to the competition constructed.
- b. The team will attach the lever arm to a support rod (diameter 1.8 cm) with not more than 15 cm of duct tape (width 2.5 cm). Tape may not touch the lever arm farther than 2cm from the area of attachment of the lever arm and support rod.
- c. The support rod will be attached to a lab table perpendicular to the table. The lever arm may be attached to the support rod orientated either parallel or perpendicular to the surface of the lab table.
- d. The lever arm is to be constructed of plastic drinking straws with a diameter of 0.635 cm (0.25 in).
- e. Straws may be cut or bent.
- f. Not more than three straws may be placed inside each other.
- g. Not more than three straws may touch one another at a time in a parallel arrangement (i.e. four or more straws may not be pinned together side by side).
- h. Pins used are to be straight pins. Pins may be cut or bent.

COMPETITION AND SCORING:

- a. The judge will mass the lever arm prior to adding the 1 kg mass.
- b. The lever arm must be designed so that a 1 kg mass can be hung from the bottom outermost part of the arm, a minimum of 25 cm away from the support rod. Additionally, the mass must be free to swing (unobstructed) in all directions.
- c. The mass used will be a 1 kg hooked weight similar to that found in the 2000 Sargent-Welch Catalog (item number WLS-43322-11, page 939).
- d. The lever arm must support the 1 kg mass for 10 seconds.
- e. Once the weight is added, the lever arm may not deflect more than 10 degrees below its starting position.

$$\mathbf{SCORE} = \frac{(\text{Lowest mass of successful lever})}{(\text{Mass of your lever})} \times 100 \text{ points}$$