SPH 4C - Pully and Lever Activity

Start by googling "force lever labs physics interactive" Click on something similiar to below or type it in.

http://www.edinformatics.com/il/il\_physics.htm

click on pulleys

## **PULLEY FAMILY:**

You must use four calculations to show the effect of using more pulleys.

- 1. G- is the hanging mass and G' is the mass of the hanging pulleys.
- 2. You must choose four different masses for G and G' then anyone else.
- 3. Calculate with each of the four different masses, the Effort Force needed. Show the calculations. For each mass you must use 2, 4, and 6 pulleys.
- 4. In total you should have 3 calculations.

**Purpose**: To determine the mechanical advantage of simple and compound pulley systems.

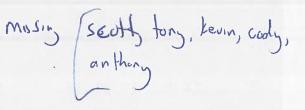
1. Complete the following table.

Masses 1 (G and G')

|                     | Effort (N) | Load (N) | Mechanical Advantage<br>(Load / Effort) |
|---------------------|------------|----------|---|
| Compound Pulley (2) |            | ¥        |   |
| Compound Pulley (4) |            |          |   |
| Compound Pulley (6) |            |          |   |

Same chart you need to make for masses 2, masses 3 and masses 4.

- 2. Based on your observations, which pulley system has a larger mechanical advantage.
- 3. Based on your observations, what disadvantage does the compound pulley system exhibit?
- 4. The compound pulley system in the animation has 2,4,or 6 strands supporting the masses as it lifts. Sketch a pulley system that uses 3 strands to support a load. What would be its mechanical advantage?



Return to previous screen and then click on levers.

## LEVER FAMILY:

**Purpose**: To investigate the mathematical relationship between Load, Effort, Load Arm and Effort Arm when a lever is balanced.

- Read the directions carefully. The left side is the LOAD (red).
   The right side is EFFORT (black).
- 2. Position the 4N(Load) at the 0.2 m position.
- 3. Position the masses (Effort) on the right side of the lever to attempt to balance the lever. *Test.* If the lever is balanced, record the results in the table below.
- 4. Repeat with the load at the 0.40m and 0.6m mark to complete the table. For the third mass use two EFFORT masses.

| Trial                          | One   | Two   | 8N .6m |       |
|--------------------------------|-------|-------|--------|-------|
| F <sub>L Load</sub>            | 4N    | 4N    |        |       |
| d <sub>L Load Arm</sub>        | 0.2 m | 0.4 m |        |       |
| F <sub>E Effort</sub>          |       |       |        | 14    |
| d <sub>E Effort Arm</sub>      |       |       |        | , 444 |
|                                |       |       |        |       |
| F <sub>L</sub> xd <sub>L</sub> |       | 1     |        | :     |
| F <sub>E</sub> xd <sub>E</sub> |       |       | + S4   | ζ4.,  |

\*Note: Trial Three requires two masses (Efforts) to balance.

**Analysis:**