Simple Machines
Disclaimer

The AMMQC program is an Equal Opportunity program. Adaptive equipment is available upon request for individuals with disabilities.

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THREE CLASSES OF LEVERS

1\textsuperscript{st} Class

2\textsuperscript{nd} Class

3\textsuperscript{rd} Class
EQUILIBRIUM

Resistance Force (RF) x Resistance Distance (RD) = Effort Force (EF) x Effort Distance (ED)
MECHANICAL ADVANTAGE OF LEVERS – MA

\[ MA = \frac{RF}{EF} \quad \text{or} \quad \frac{ED}{RD} \]
SAMPLE – 1st CLASS

Hand Truck

MA = RF / EF = 300 / 100 = 3
OR
MA = ED / RD = 3/1 = 3
SAMPLE – 2nd CLASS

MA = RF / EF = 90 / 30 = 3
OR
MA = ED / RD = 3/1 = 3
SAMPLE – 3rd CLASS

\[ MA = \frac{RF}{EF} = \frac{3000}{6000} = 0.5 \]

OR

\[ MA = \frac{ED}{RD} = \frac{20}{40} = 0.5 \]
MECHANICAL ADVANTAGE OF PULLEYS – MA

MA = RF/EF
FIXED PULLEY

Redirects the direction of the Effort Force

\[ MA = \frac{RF}{EF} = 1 \]

(No Mechanical Advantage)
MOVABLE PULLEY

MA = RF / EF = RF / (RF/2) = 2
COMBINATION OF PULLEYS #1

\[ \frac{RF}{2} \]

\[ EF = \frac{RF}{2} \]

\[ MA = \frac{RF}{EF} = \frac{RF}{(RF/2)} = 2 \]
COMBINATION OF PULLEYS #2

$MA = RF / EF = RF / ((RF/2) / 2) = 4$
INCLINED PLANE

MA = RF / EF or ED / RD