$$\text{Work} = [F][\Delta d] \Rightarrow [N][M]$$

NEWTONS, METRES, JOULE

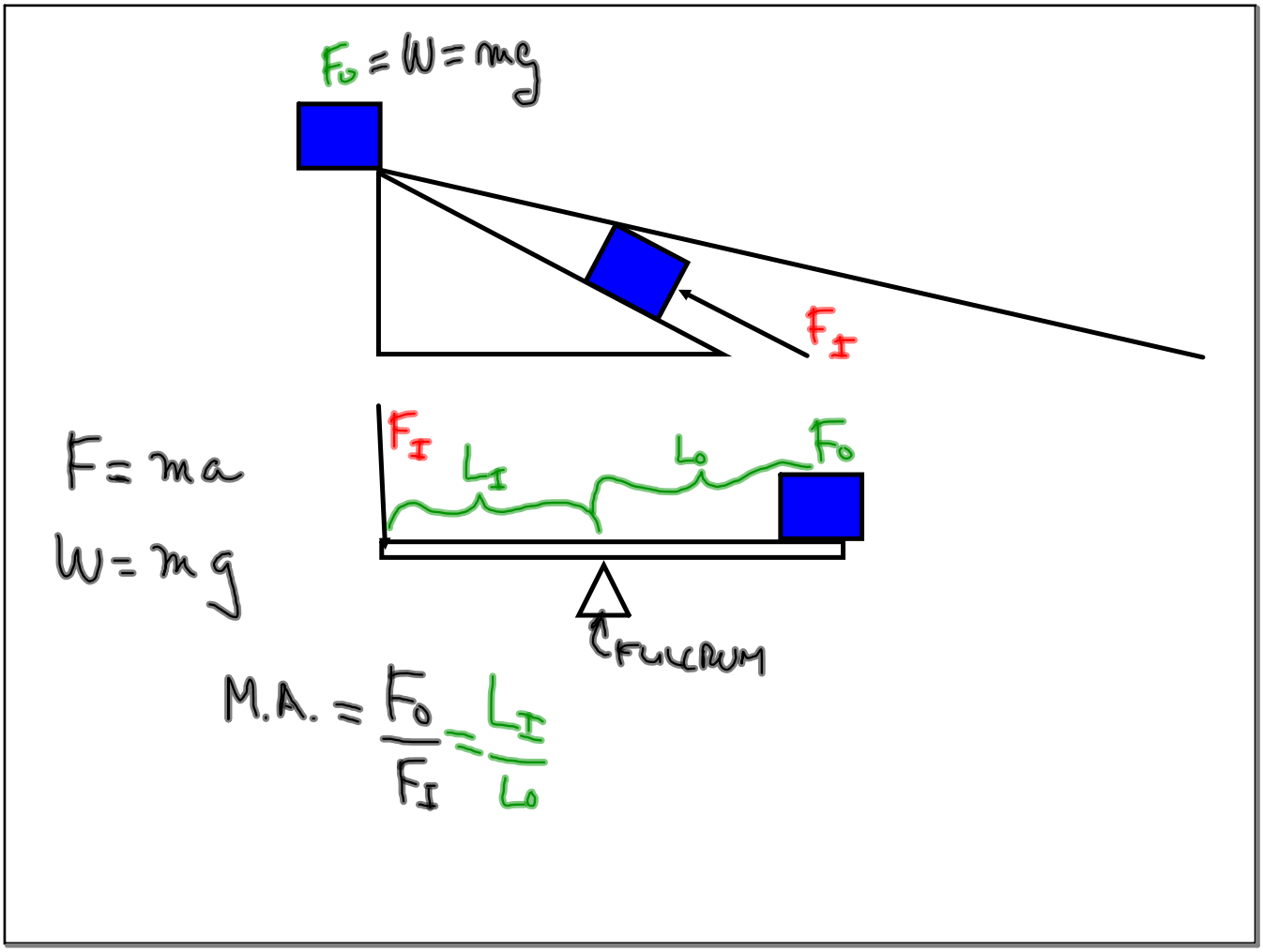
ENERGY $\Rightarrow$ ABILITY TO DO WORK

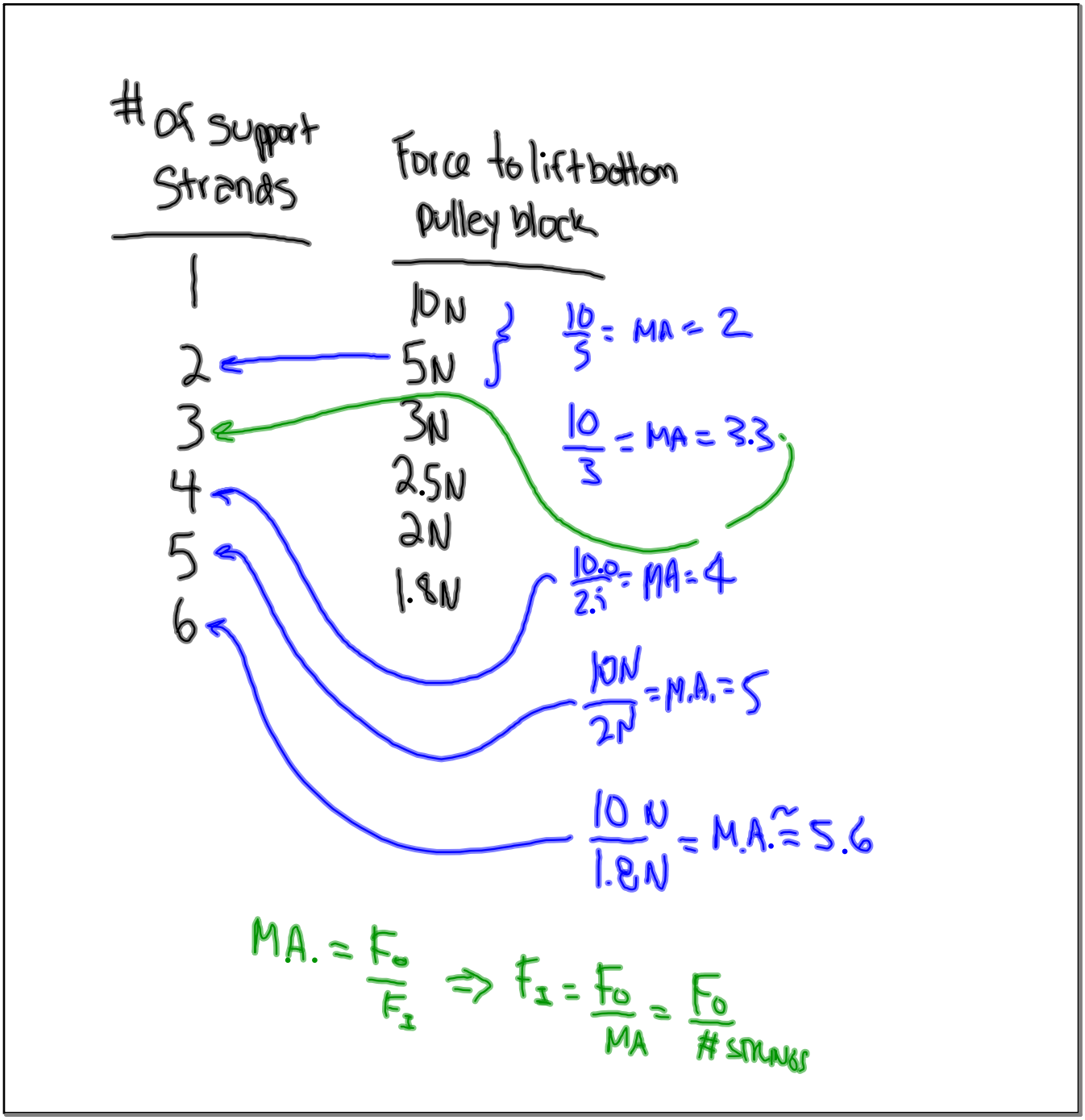
WORK & ENERGY are MEASURED IN JOULES.

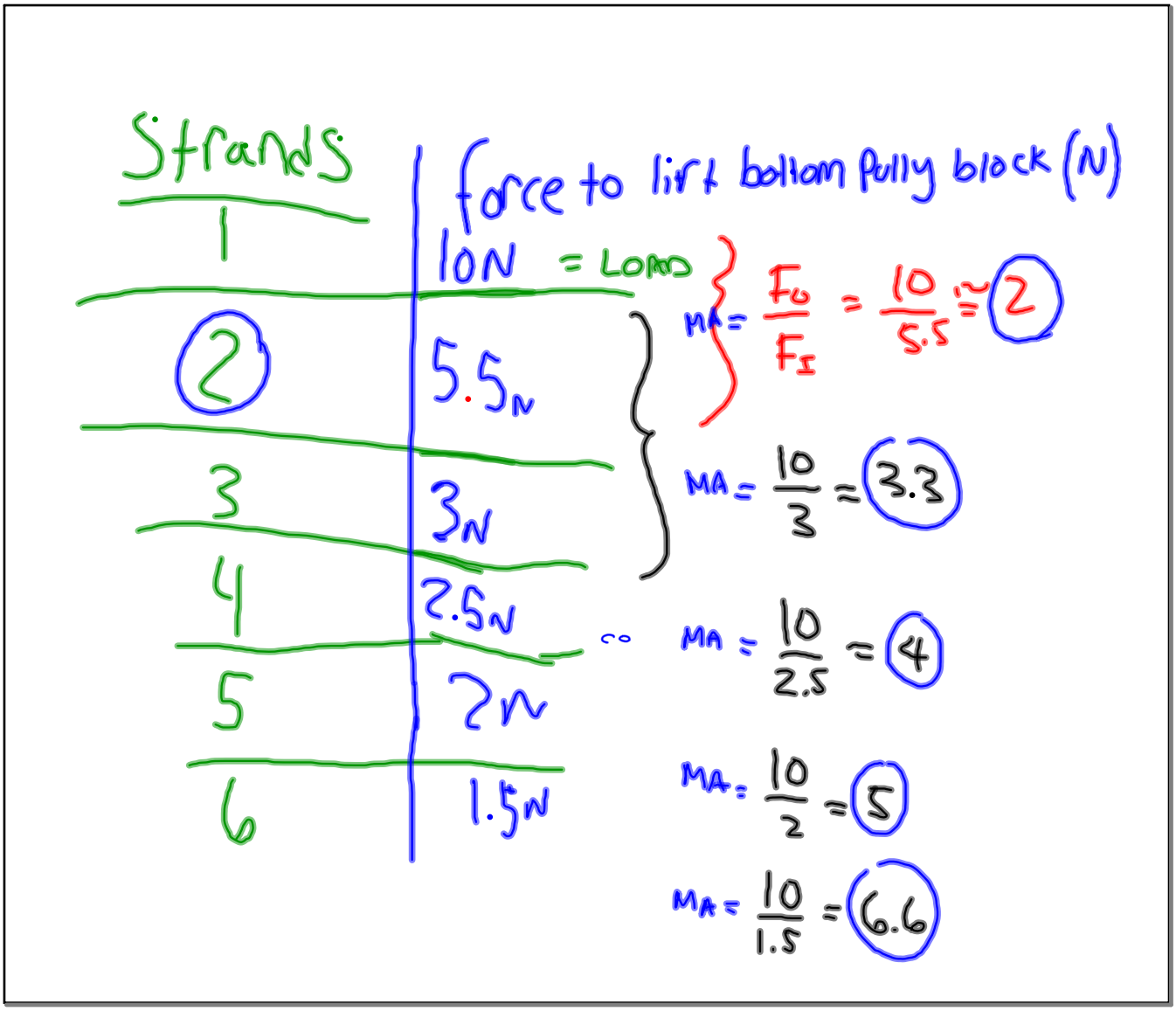
e.g. Work = 170 J, Force = 140 N $\Big\}$ $W = [F][d]$

$$\frac{170\text{J}}{140\text{N}} = \frac{[140\text{N}][d]}{140\text{N}} = 1.21\text{ M}$$

A SIMPLE MACHINE IS A HUMAN MADE DEVICE DESIGNED TO ASSIST IN THE ACCOMPLISHMENT OF WORK - USUALLY BY LOWERING THE INPUT FORCE REQUIRED.

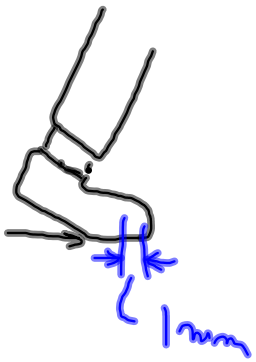

$F_o = W = mg$
F_I
F_I
L_I
L_o
F_o
FULCRUM
$F = ma$
$W = mg$
$M.A. = \frac{F_o}{F_I} = \frac{L_I}{L_o}$


# of support Strands
Force to lift bottom Pulley block
1
10N
2
5N
3
3N
4
2.5N
5
2N
6
1.8N
10/5 = MA = 2
10/3 = MA = 3.3
10.0/2.5 = MA = 4
10N/2N = M.A. = 5
10 N/1.8N = M.A. ≈ 5.6
MA. = F_o/F_I ⇒ F_I = F_o/MA = F_o/# strands


Strands
force to lift bottom pully block (N)
1
10N = LOAD
2
5.5N
3
3N
4
2.5N
5
2N
6
1.5N
MA = F_O / F_I = 10 / 5.5 ≈ 2
MA = 10 / 3 = 3.3
MA = 10 / 2.5 = 4
MA = 10 / 2 = 5
MA = 10 / 1.5 = 6.6

UNITS of WORK = [NEWTONS][METERS]

= NEWTONS × METERS



PUKES

$W = (F)(d)$

$170J = (140N)(d)$

$d = 1.21M$