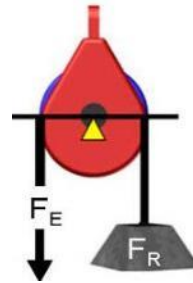


Part 4 — Pulleys

Fixed Pulley



1. Label the drawing of the fixed pulley (F_E , F_R , D_E , D_R)
2. Calculate the ideal mechanical advantage of the fixed pulley.
(*hint: number of strands that support the load*).
3. Record your known resistance force here: $F_R =$ _____ (see Part 0)
4. Predict (by calculating it) the amount of effort force you would need to use in “ideal conditions” in order to overcome the known resistance force you use the pulley.
(*hint: Use $AMA = IMA$*).

$$F_{E_{predicted}} = \underline{\hspace{2cm}}$$

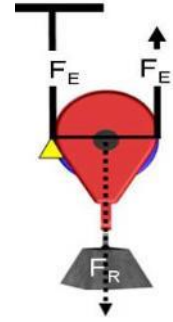
5. Use a force sensor to measure the actual effort force required when you use the pulley.

$$F_{E_{actual}} = \underline{\hspace{2cm}}$$

6. Calculate the actual mechanical advantage of the fixed pulley system.
7. Calculate the efficiency of the fixed pulley system.

Please explain why you think your fixed pulley system has the efficiency you just calculated.

Moveable Pulley



1. Label the drawing of the moveable pulley (F_E , F_R , D_E , D_R)
2. Calculate the ideal mechanical advantage of the moveable pulley.
(*hint: number of strands that support the load*).
3. Record your known resistance force here: $F_R =$ _____ (see Part 0)
4. Predict (by calculating it) the amount of effort force you would need to use in “ideal conditions” in order to overcome the known resistance force you use the pulley.
(*hint: Use $AMA = IMA$*).

$$F_{E_{predicted}} = \underline{\hspace{2cm}}$$

5. Use a force sensor to measure the actual effort force required when you use the pulley.

$$F_{E_{actual}} = \underline{\hspace{2cm}}$$

6. Calculate the actual mechanical advantage of the moveable pulley system.
7. Calculate the efficiency of the moveable pulley system.

Please explain why you think your moveable pulley system has the efficiency you just calculated.

Block & Tackle

1. Label the drawing of the block and tackle pulley system
(F_E , F_R , D_E , D_R)



2. Calculate the ideal mechanical advantage of the block & tackle pulley system. (*hint: number of strands that support the load*).
3. Record your known resistance force here: $F_R =$ _____ (*see Part 0*)
4. Predict (by calculating it) the amount of effort force you would need to use in “ideal conditions” in order to overcome the known resistance force you use the block & tackle pulley system. (*hint: Use $AMA = IMA$*).

$$F_{E_{predicted}} = \underline{\hspace{2cm}}$$

5. Use a force sensor to measure the actual effort force required when you use the block & tackle pulley system.

$$F_{E_{actual}} = \underline{\hspace{2cm}}$$

6. Calculate the actual mechanical advantage of the block & tackle pulley system.
7. Calculate the efficiency of the block & tackle pulley system.

Please explain why you think your fixed pulley system has the efficiency you just calculated.