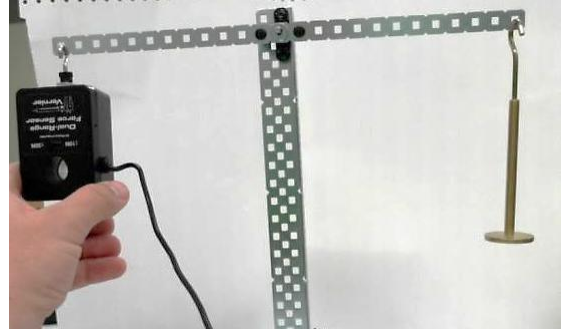


Part 1 – Levers

First Class Lever

1. Label the drawing of the first class lever (F_E , F_R , D_E , D_R)



2. Measure the length of the effort arm and record it here: $D_E =$ _____
3. Measure the length of the resistance arm and record it here: $D_R =$ _____
4. Calculate the ideal mechanical advantage of the lever system.
5. Record your known resistance force here: $F_R =$ _____ (see Part 0)
6. 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. (hint: Use $AMA = IMA$)

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

7. Use a force sensor to measure the actual effort force required when you use the lever to lift the known resistance force and record it here:

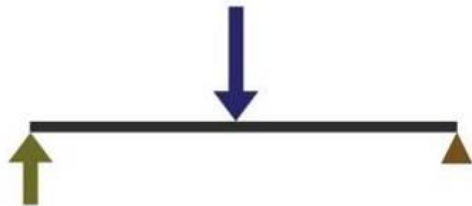
$$F_{E_{actual}} = \underline{\hspace{2cm}}$$

8. Calculate the actual mechanical advantage of the lever system.
9. Calculate the efficiency of the lever system.

Please explain why you think your inclined plane has the efficiency you just calculated.

Second Class Lever

1. Label the drawing of the second class lever (F_E , F_R , D_E , D_R)



2. Measure the length of the effort arm and record it here: $D_E =$ _____

3. Measure the length of the resistance arm and record it here: $D_R =$ _____

4. Calculate the ideal mechanical advantage of the lever system.

5. Record your known resistance force here: $F_R =$ _____ (see Part 0)

6. 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. (hint: Use $AMA = IMA$)

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

7. Use a force sensor to measure the actual effort force required when you use the lever to lift the known resistance force and record it here:

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

8. Calculate the actual mechanical advantage of the lever system.

9. Calculate the efficiency of the lever system.

Please explain why you think your inclined plane has the efficiency you just calculated.

Third Class Lever

1. Label the drawing of the third class lever (F_E , F_R , D_E , D_R)



2. Measure the length of the effort arm and record it here: $D_E =$ _____

3. Measure the length of the resistance arm and record it here: $D_R =$ _____

4. Calculate the ideal mechanical advantage of the lever system.

5. Record your known resistance force here: $F_R =$ _____ (see Part 0)

6. 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. (hint: Use $AMA = IMA$)

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

7. Use a force sensor to measure the actual effort force required when you use the lever to lift the known resistance force and record it here:

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

8. Calculate the actual mechanical advantage of the lever system.

9. Calculate the efficiency of the lever system.

Please explain why you think your inclined plane has the efficiency you just calculated.