FORCE MODEL

NEWTON'S 1ST LAW

"UNLESS YOU PUSH OR PULL SOMETHING, IT WILL KEEP DOING WHAT IT IS DOING"

OBJECTS SITTING STILL WILL REMAIN SITTING STILL AND OBJECTS MOVING IN A STRAIGHT LINE WILL REMAIN MOVING IN A STRAIGHT LINE, UNLESS YOU APPLY A FORCE (PUSH OR PULL) TO IT

NEWTON'S 2ND LAW

"F=MA"

1. DRAW FBD

THE FBD OR "FREE BODY DIAGRAM" IS A PICTURE OF AN OBJECT SHOWING ALL THE FORCES (NOT VELOCITIES, ACCELERATIONS OR OTHER VECTORS) THAT ACT ON THE OBJECT (AS OPPOSED TO FORCES THAT THE OBJECT APPLIES TO OTHER OBJECTS)

2. ΣF

$$\sum F_x \rightarrow^{+} = \square = ma_i = \square$$

$$\sum F_y \uparrow^{+} = \square = ma_j = \square$$

$$\sum F_r \rightarrow^{+} = \square = ma_c = \square = \frac{mv^2}{r}$$

3. SOLVE

NEWTON'S 3RD LAW

"YOU PUSH ON ME,
I PUSH BACK ON YOU WITH THE SAME FORCE"

THE FORCE THAT OBJECT "A" APPLIES TO OBJECT "B" IS EQUAL AND OPPOSITE TO THE FORCE THAT OBJECT "B" APPLIES TO OBJECT "A", EVEN IF THE OBJECTS ARE MOVING!

SUPPLEMENTAL EQUATIONS

HOOKE'S LAW (ELASTIC OBJECTS)

$$F_s = -kx$$

FRICTIONAL FORCE

$$f = \mu F_N$$

CENTRIPETAL ACCELERATION / FORCE

$$a_c = \frac{v^2}{r} \qquad F_c = \frac{mv^2}{r}$$