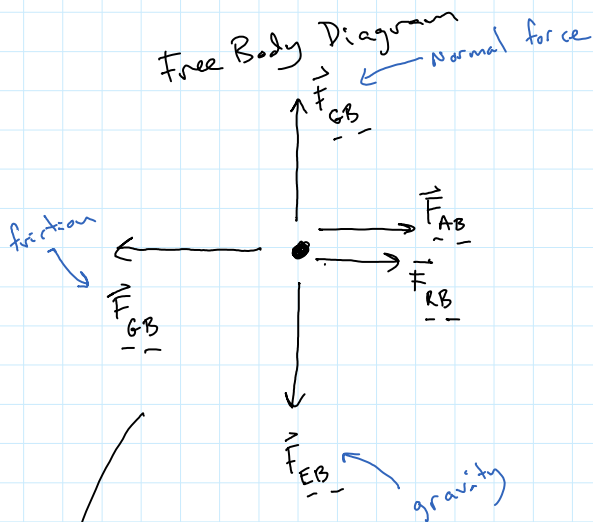
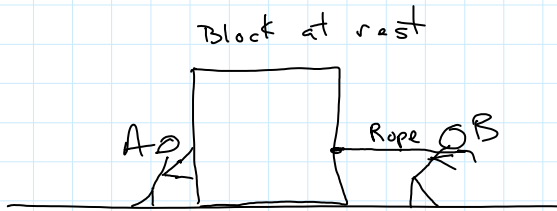


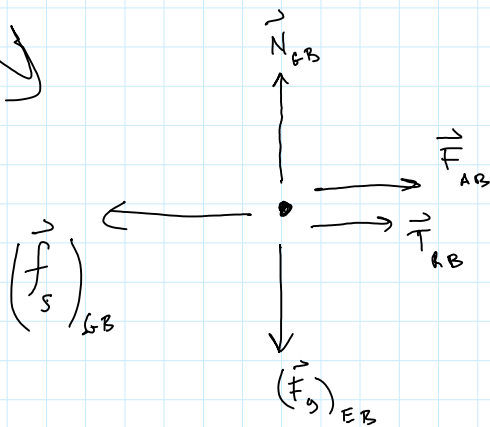
Goals for the Lecture:

- 1) Understand Newton's First Law, inertia, and the role it plays in motion
- 2) Understand Newton's Second Law, forces, and the role they play in acceleration
- 3) Be able to draw free body diagrams for objects on flat surfaces



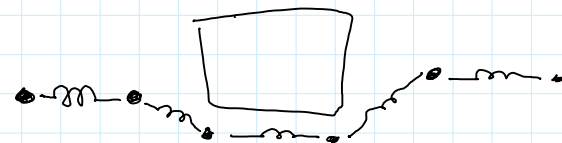
using:

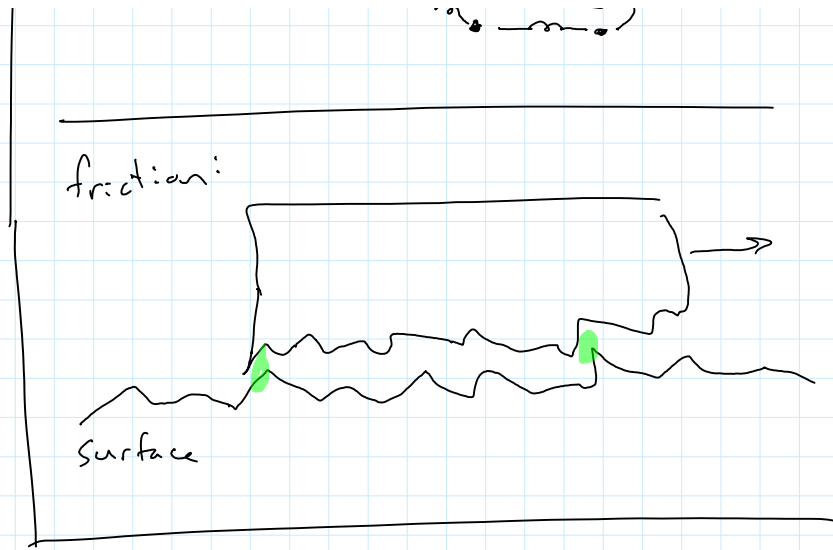
- T tension in a rope or string
- N normal force
- W or F_g weight or force of gravity
- f friction
- F force (any remaining force)



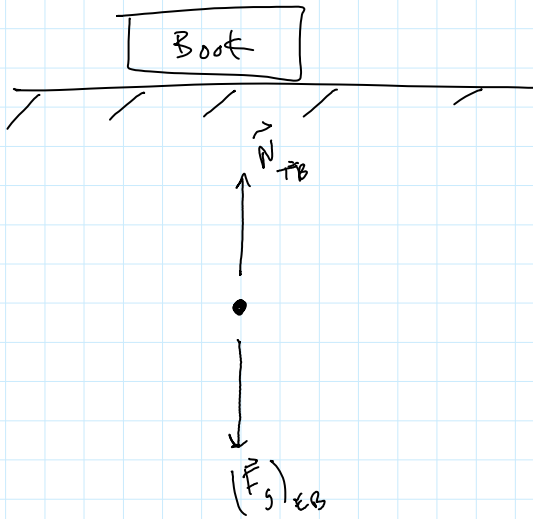
Normal Forces:

Surface:

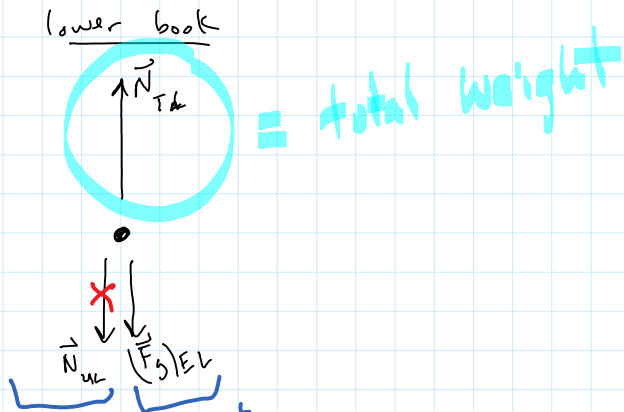
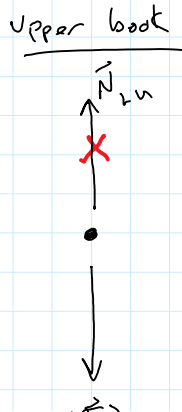
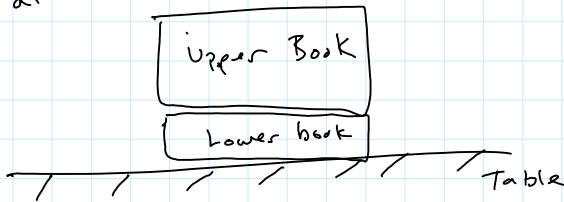


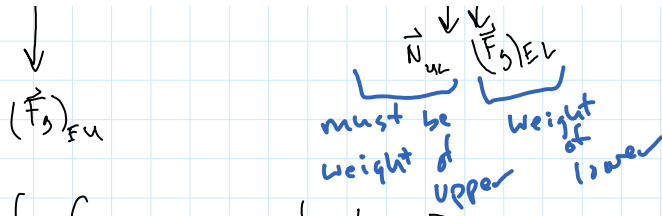


Book at rest on table:



Now: at rest



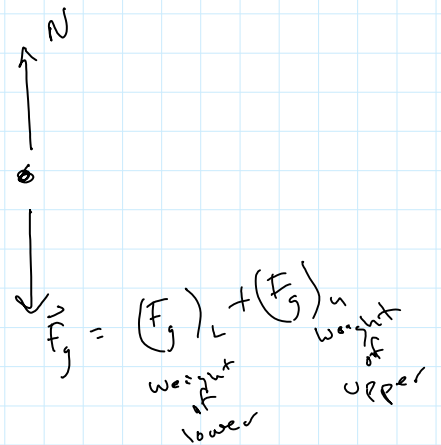
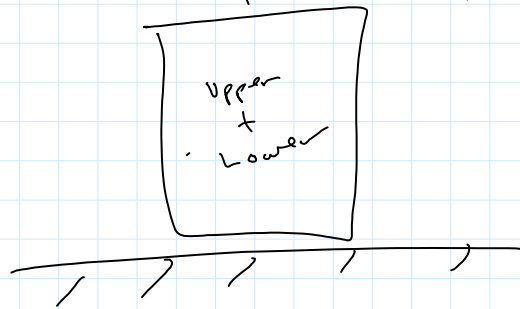


Sum of forces must be zero on each book:

Lower: $|\vec{N}_{TL}| = |\vec{N}_{UL}| + |(\vec{F}_g)_{EL}|$

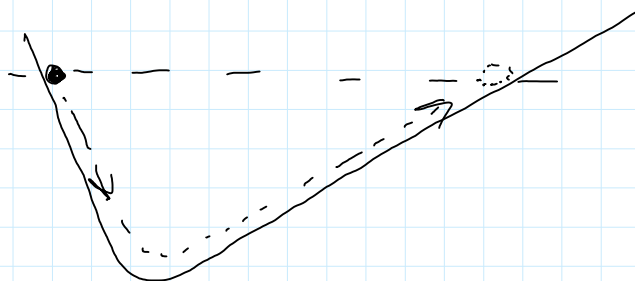
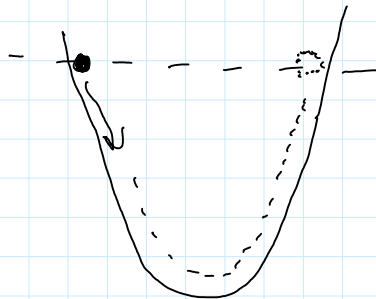
Upper: $|\vec{N}_{LU}| = |(\vec{F}_g)_{EU}|$

both: $|\vec{N}_{LU}| = |\vec{N}_{UL}|$



Newton's Laws

1) Inertia





mass

2nd Law:

$$\vec{F}_{\text{Net}} = m \vec{a}$$

Net force inertia acceleration

$$a = \frac{F_{\text{Net}}}{m}$$

$$\Sigma \vec{F} = m \vec{a}$$

3rd Law:

When 2 objects interact:

$$\vec{F}_{AB} = - \vec{F}_{BA}$$

worksheets
II-5

