CHAPTER 5

* What is force? Kinds of forces

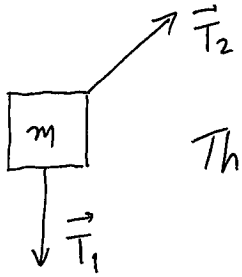
* Mass (m): Your car is much harder to push than your bicycle. The tendency of an object to resist a change in its velocity is called inertia.

  Mass is an "intrinsic" property of an object.

* Newton's second law: The acceleration is determined by the net force $\vec{F}_{net}$.

$$\vec{a} = \frac{\vec{F}_{net}}{m} \quad \text{where} \quad \vec{F}_{net} = \vec{F}_1 + \vec{F}_2 + \vec{F}_3 + \ldots = \sum_{i=1}^{N} \vec{F}_i$$

  * The acceleration is in the same direction as the net force.



$$\vec{a} = \frac{\vec{F}_{net}}{m} = \frac{\vec{T}_1 + \vec{T}_2}{m}$$

The amplitude of acceleration is NOT $\frac{T_1 + T_2}{m}$.

  * One Newton (N) is the force that causes 1 kg of mass to accelerate at 1 m/s^2.

$$1\ N = 1\ kgm/s^2$$

* Newton's First Law: Object at rest vs. (Object in motion with constant velocity)

  Greek's question: What causes objects to move.

  Newton's question: What causes an object to change its velocity.

  * Inertial reference frames: Ball sitting in a plane.

* Free Body Diagrams