

## Warm-Up:

Ups: Physics

### Which Way Whiplash?

Newton's first law of motion states that objects at rest tend to stay at rest, while objects in motion tend to stay in motion unless a force acts on them. Devices such as seat belts and air bags are used to protect passengers from the consequences of this law when accidents occur.

Another safety device that has been added to vehicles is the head restraint. When a car is hit from behind, Newton's first law comes into play. Many people say that in such an accident without head restraints, the person's head whips backwards, causing the injury known as whiplash. As an observer watching from outside the car, use Newton's first law of motion to explain what really happens to the person's head and why a head restraint would help.

- Newton defined a force as a push or pull on an object  
↳ interactions between objects

#### 1. Contact:

- ↳ Applied Force
- ↳ Tension
- ↳ Friction
- ↳ Normal Force

#### 2. Non-Contact

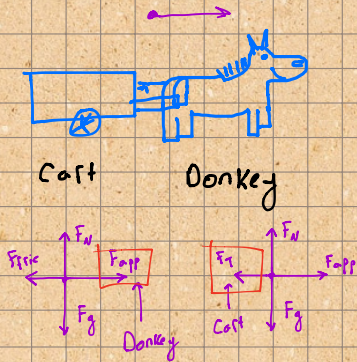
- ↳ Gravity
- ↳ Magnetic Force
- ↳ Electrostatic Force

- Newton's 3rd law: For every action there is an equal and opposite reaction

↳ Ex: Hammer and a Nail

↳ Hammer acts on nail ↔ nail acting on hammer

- Third Law Force Pairs: action and reaction forces



\* Cannot have action/reaction on the same FBD!