

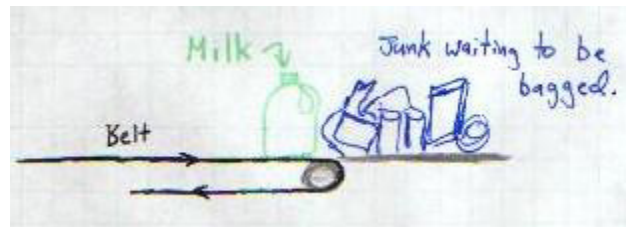
## DAY 10

### Homework Assignment (see syllabus for homework collection information)

1. Re-work example problem #1 for today but with the truck in the right lane going 70 mph and the truck in the left lane passing at 85 mph. Again, the slower truck stops just short of the wrecked semi.
2. A 20 kg model rocket has an engine that generates 2000 N of thrust for 10 s before running out of fuel. The rocket is launched vertically on a planet where the gravitational field strength is 1/4 what it is on Earth and there is no air. How long is it in flight before hitting the ground? The mass of the fuel is not significant.

NOTE to purists -- it's a large planet, so the  $g$  field strength is pretty constant for at least a thousand km above the surface of the planet.

3. A conveyor belt at a grocery store moves at 5 ft/sec. A gallon of milk sits on the conveyor, but it does not move because a bunch of stuff is piled up in front of it. The belt slides underneath it. The  $\mu_k$  between the milk and the belt is 0.65. Determine the power required to keep the belt moving at constant speed if there are four gallons of milk sitting on the belt.



4. A 3000 lb car moving at 20 mph plows into the front of a 5500 lb truck moving at 10 mph in the opposite direction. The two stick together after the wreck. How fast will the wreckage be moving after the collision? How much KE was lost in the collision? Where did that energy go?