

Power = Energy/time

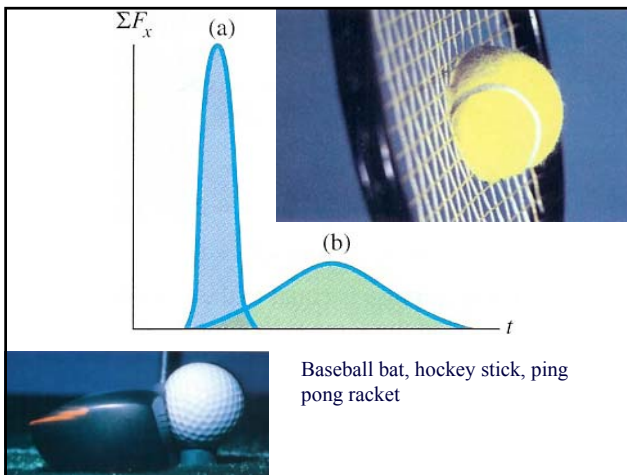
- Not just mechanically
- Rusting
 - Fe reacting with O
- Fire
- Explosives
 - Chemically are the same, e.g. something reaction with oxygen and releasing energy
 - Time of reaction is the main difference → power
- 6.8 Other forms of energies
- 6.9 Work done by a variable forces

Chapter 7 Impulse and Momentum

- We will use the first exam grade for the final grade of the semester, and there won't be any more exams.
- That is an impulse.
- DON'T TAKE IT SERIOUSLY!!!

7.1, Impulse – momentum theorem

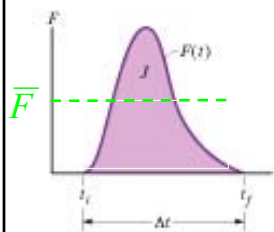
- In physics, it is defined as
 - Impulse = $F \cdot \Delta t$ (unit: N · s)
 - In plain language, it is the time total of a force, it can change/move things



Average force

Most of the time, the force is not constant. But you can always find an average for convenience

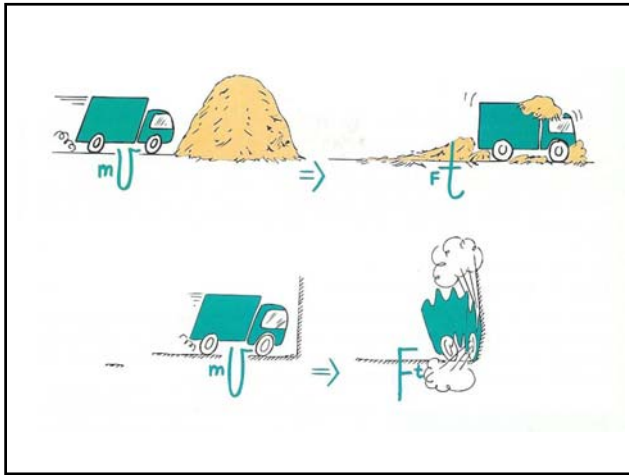
Impulse is the area under the curve



$$\text{impulse} = \bar{F} \Delta t$$

For an given impulse, you can find the average force (giving an idea what can happen during that time period)

$$\bar{F} = 5.22 / 0.004 = 1,305 \text{ (N)}$$



- If you are asked to define momentum...

$$\bar{F} = m\bar{a}$$

$$\text{Impulse} = mv_f - mv_i$$

- Impulse is equal to the change of momentum
 - › The impulse-momentum theorem
 - › You want a lot of impulse when you hit a baseball

7.2 The principle of momentum conservation

If there is a hurricane (external force), anything can happen.

If there is no external force, they follow rules



- For Jane: $F_{21} \Delta t = m_1(v_{1f} - v_{1i})$
- For Fred: $F_{12} \Delta t = m_2(v_{2f} - v_{2i})$
- $F_{21} = -F_{12}$ (action-reaction)
- $m_1(v_{1f} - v_{1i}) = -m_2(v_{2f} - v_{2i})$
- $m_1v_{1i} + m_2v_{2i} = m_1v_{1f} + m_2v_{2f}$

momentum is conserved.

A physics option, with the rising gas price and environmental issues:

1. Car pool
2. Car pool and don't use gas



Initial momentum = 0

If rocks move to the left with a velocity (momentum to the left), there has to be a momentum to the right from the car to keep final momentum = 0

Nice physics, but very dumb idea!

Not as dumb as it looks

