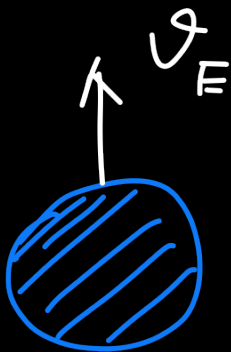


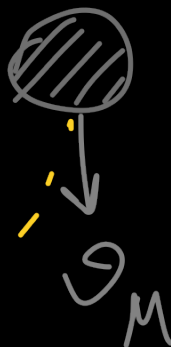
Homework 6.

#1.



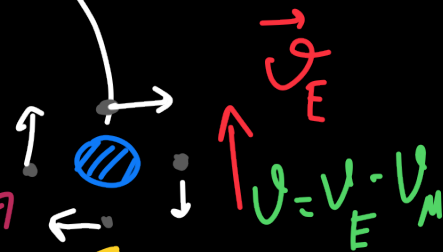
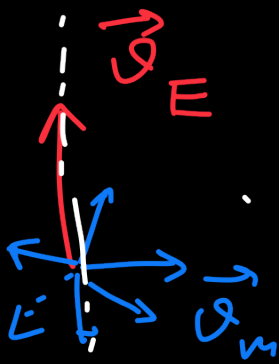
$$v_E = 30 \frac{\text{km}}{\text{s}}$$

$$v_M = 1 \frac{\text{km}}{\text{s}}$$



Max: $31 \frac{\text{km}}{\text{s}}$

Min: $29 \frac{\text{km}}{\text{s}}$



$$v = \sqrt{v_M^2 + v_E^2}$$

$$v = v_E + v_M$$

#2.

$$t_r = 2400 \text{ s.}$$

$$\leftarrow \frac{d}{v_B + v_2} + \frac{d}{v_B - v_2}$$

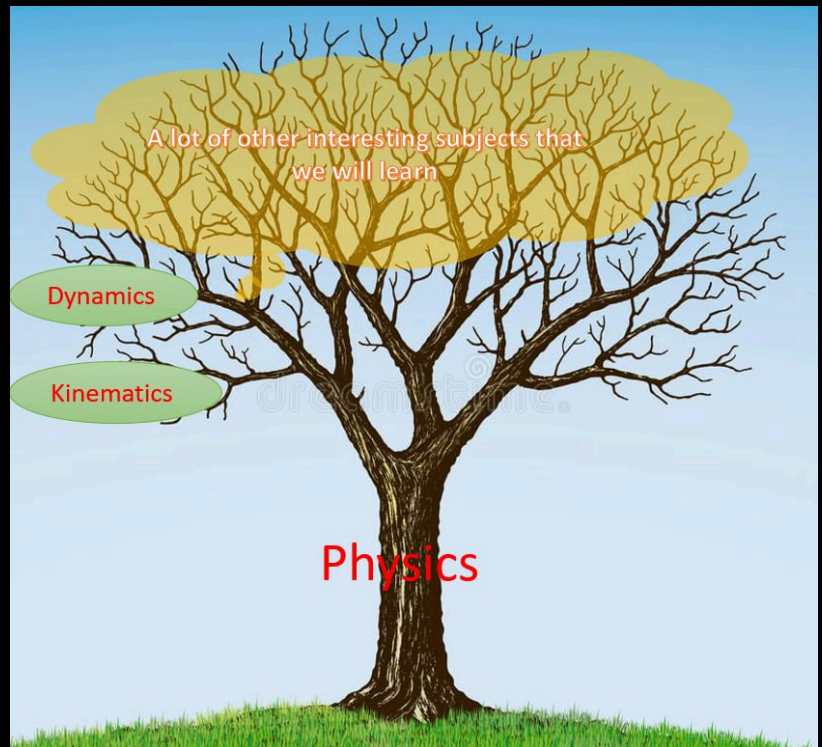
$$t_n = \frac{2d}{v_B} \approx \underline{22 \text{ min}}$$

hint: $v_r = v_B$.

Inertia and Newton's LAWS

↓ (Forces)
What causes
the motion?

$d, \vec{d}, \vec{v}, \vec{a},$
ref. frames



What can cause motion?

— Force, or interactions with
other objects!

Does the interactions have to
occur for the object to be
in motion?

Before Galileo and Newton:

objects have a tendency to slow down!

Newton's 1st law:

An object at rest ($v=0$) remains at rest, and an object in motion remains in motion unless it interacts with other objects.

Newton's 2nd law

$$\boxed{\vec{F} = m \cdot \vec{a}}$$

m - the mass.

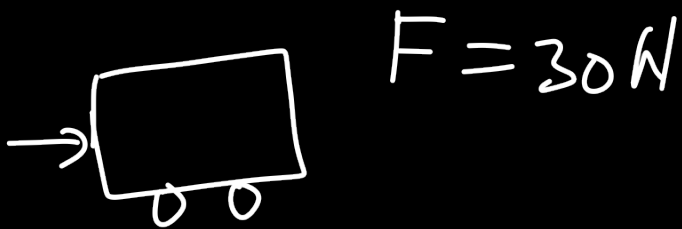
\vec{F} - net force.

\vec{a} - acceleration

(mass \neq weight.)

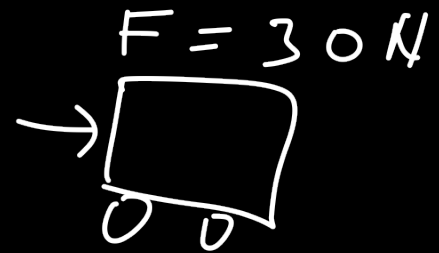
$$1 \text{ N} = 1 \text{ kg} \cdot 1 \frac{\text{m}}{\text{s}^2} = 1 \cdot \frac{\text{kg} \cdot \text{m}}{\text{s}^2}$$

Exercise 1: shopping cart



$$m_1 = 10\text{ kg}$$

$$a_1 = \frac{F}{m_1} = 3 \frac{\text{N}}{\text{kg}} \\ = 3 \text{ m/s}^2$$



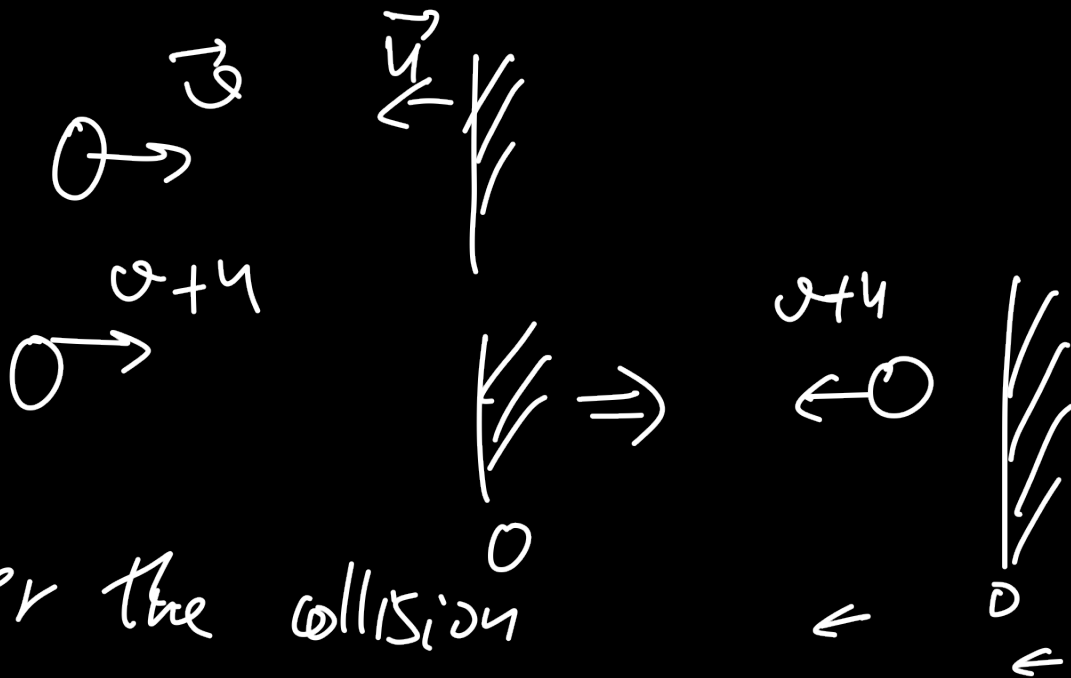
$$m_2 = 30\text{ kg}$$

$$a_2 = \frac{F}{m_2} = 1 \frac{\text{N}}{\text{kg}} \\ = 1 \text{ m/s}^2$$

HW 6 continued:

#3

Before collision:



After the collision

