Acceleration

- **Acceleration:**

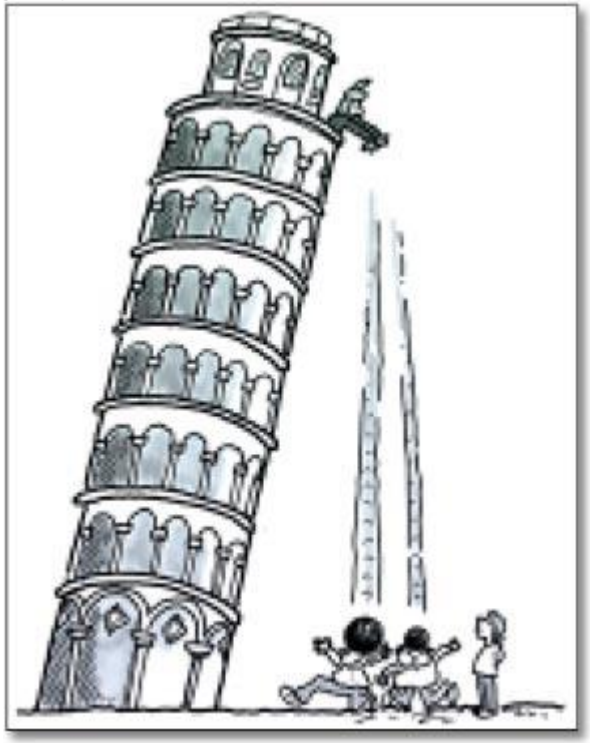
$$a = \frac{\text{change in velocity}}{\text{change in time}} = \frac{\Delta v}{\Delta t}$$

Standard units of acceleration : m/s^2

- **If there were no air resistance, all objects in Earth gravity would fall with the same acceleration,**

$g = 9.81\ m/s^2$

(directed downward)



Galileo Galilei's experiment in Pisa (possibly, a legend)

Homework

Problem 1. An ball is thrown vertically upwards with initial speed v_0=30m/s. Gravitational acceleration is g = 9.81 m/s^2, and is directed downward. What will be the velocity of the ball after time t=4s?

Problem 2. A car of length L=4.0m is moving on a road. Its position is determined by three photogates (like we did in class): Gate 1. Gate 2 and Gate 3. The table below shows the time moments at which each of gates gets blocked and unblocked (t_1 and t_2), in seconds:

GATE #	t_1 ,s (gate blocked)	t_2 ,s (gate unblocked)	v, m/s
Gate 1	0.000	0.120	
Gate 2	5.210	5.300	
Gate 3	7.070	7.140	

a) Find the speed of the car at the moments when it passed each gate, and fill the blanks in the table.

b) Find accelerations of the car when it travels between Gates 1 and 2, and Gates 2 and 3

c) Estimate the distances between Gates 1,2 and 3.