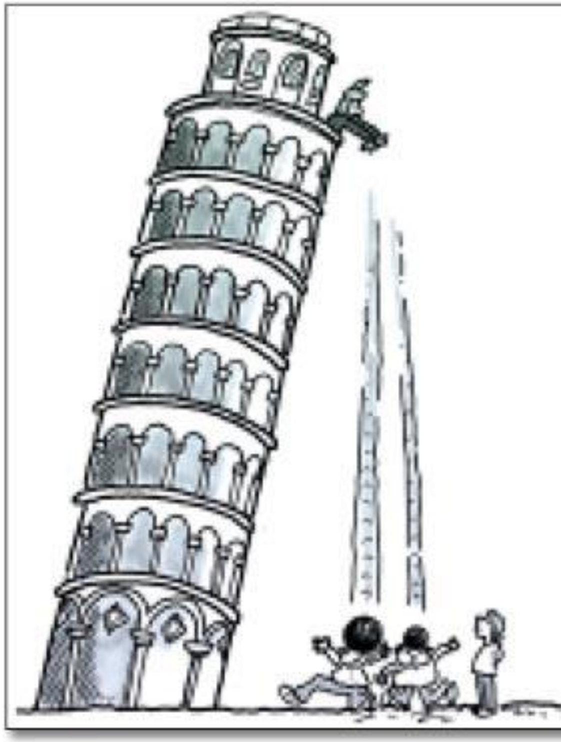
Acceleration

- Acceleration: $$a = \frac{\text{change in velocit y}}{\text{change in time}} = \frac{\Delta v}{\Delta t}$$

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)

- For motion at constant acceleration *a* , with no initial speed, the displacement after time *t* is:

$$\mathrm{D}x = v_{average}t = \left(\frac{0+at}{2}\right)\times t = \frac{at^2}{2}$$

Homework 4

Problem 1. An ball is thrown vertically upwards with initial speed v_0=30m/s. Gravitational acceleration is g =10 m/s^2, and is directed downward. What will be the velocity of the ball after time t=4s?

Problem 2.

Suppose that you are trying to reproduce an experiment of Galileo by dropping a rock from certain tower. The time of its free fall turns out to be t=5.0 seconds.
a) How tall is the tower?
b) What will be the time of the rock's fall if it is dropped from half the tower's height?

Problem 3.

The largest passenger airplane, Airbus A380, has acceleration a=2 m/s^2 during its take-off.

a) How much time it needs to reach the take off speed v= 280 km/hr?
b) How long the runway should be?