Example On Halloween let's say you decided to drop pumpkins from the roof of Altgeld Hall –totally illegal for the reasons it will become clear soon. And assume Altgeld Hall is 80 meters high.
The equation of motion for objects near the earth surface implies that the height above ground "h" of the pumpkin is:

$$h = 80 - 5t^2 \text{ in meters}$$

where "t" measures time in seconds. The average speed of the pumpkin (difference quotient)= $\frac{\Delta h}{\Delta t} = \frac{\textit{distance} \text{ traveled}}{\textit{time} \text{ elapsed}}$
When the pumpkin hits the ground, h=0, $80 - 5t^2 = 0$. Solve this to find $t = 4$. Thus it takes 4 seconds for the pumpkin to reach the ground

$$\text{Average Speed} = \frac{0 - 80}{4 - 0} = -20m/sec$$

A spectator is probably more interested in how fast the pumpkin is going when it slams into the ground. To find the instantaneous velocity at t=4, we need to evaluate:

$$\lim_{t \to 4} \frac{h(t) - h(4)}{t - 4} = -40m/sec \text{ about } 90mi/hr$$

Here the result is negative because the pumpkin's y-coordinate is decreasing: it is moving downward.

We will discuss the notion of "limit" next to understand the ideas explained above better.