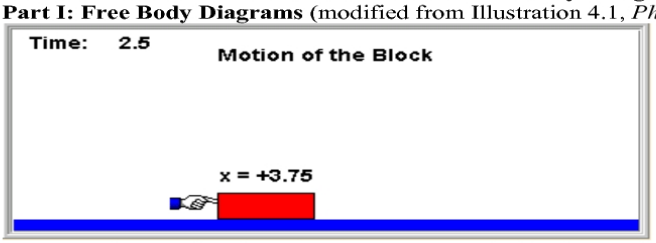
Worksheet: Newton's 3rd Law and Free Body Diagrams

Part I: Free Body Diagrams (modified from Illustration 4.1, *Physlet Physics*)



1. Press "play" and let the animation run. An 8-kg block is pushed across the floor (position is given in centimeters and time is given in seconds). Describe the motion:

2. Sketch a possible free-body diagram for the block:

3. What is the velocity of the block at t=2-seconds? _____ Show your work below: (Reminder: $v=\Delta x/\Delta t$ so, for example, measure the position of the block at t = 1.9 s and at t= 2.1 s and then calculate the velocity by taking the distance traveled during that short time and divide by the time interval)

4. What is the velocity of the block at t=4-seconds? _____ Show your work below:

5. What is the acceleration of the block? _____ Show your work below: (Reminder: $a=\Delta v/\Delta t$)

6. Therefore, the net force (sum of all the forces) in the x-direction = _____ (Reminder: Net F = ma or $\Sigma F=ma$)

7. Similarly, the net force (sum of all the forces) in the y-direction = _____