Instructions

1. Click in the Forces Graph button and check the “barriers” box.
2. Click on the slider to the left of the force graph and slide the bar up to a value of 1000 Newtons (or as close as you can get). This is your APPLIED force. You may need to adjust the y values using the + and – buttons.
3. Press GO and watch the person push the file cabinet (mass = 200 kg) to the left. Press the PAUSE button **before** he hits the wall!!!
4. In your notebook, sketch the TOTAL force-vs.-time graph. (You can hide the friction force and applied force lines by clicking on the boxes to the left and down.) Only include the x and y axis and the shape of the line/curve.
5. Does the shape of the force-vs.-time graph make sense? Why?
6. Knowing the TOTAL force and the mass of the file cabinet, calculate its acceleration below. Hint: use Newton’s 2nd Law.
7. Hide the force-vs.-time graph by pressing on the X. Press on the GRAPH ACCELERATION button. Below sketch the acceleration-vs.-time graph. Again, only include the x and y axis and the shape of the line/curve. Did the acceleration you calculated above in #5 match the acceleration value on the graph.
8. Does the shape of the acceleration-vs.-time graph make sense? Why?
9. Hide the acceleration-vs.-time graph by pressing on the X. Press on the GRAPH VELOCITY button. Below sketch the velocity-vs.-time graph. Again, only include the x and y axis and the shape of the line/curve.
10. Does the shape of the velocity vs. time graph make sense? Why?
11. Hide the velocity-vs.-time graph by pressing on the X. Press on the GRAPH POSITION button. (Position is distance!) Below sketch the position-vs.-time graph. Again, only include the x and y axis and the shape of the line/curve.
12. Does the shape of the position vs. time graph make sense? Why?
13. CLEAR the graph (left-hand button), hide the POSITION graph and reopen the APPLIED force graph.
14. Change the magnitude of the APPLIED force to **about** 1600 Newtons. You may need to adjust the y values by pressing on the + and – values. Again, press GO and watch the person push the file cabinet. Make sure to stop him before he hits the wall!!!
15. Knowing the new TOTAL force and the mass of the file cabinet, calculate its acceleration below.
16. Hide the force-vs.-time graph by pressing on the X. Press on the GRAPH ACCELERATION button. Did the acceleration you calculated above in #5 match the acceleration value on the graph?
17. What happens to the acceleration of the file cabinet as you **double** the TOTAL force? Be specific!!!
18. What relationship exists between acceleration and force?
19. Select a lighter object to push. What do you notice about its acceleration?
20. What relationship exists between acceleration and the mass of an object?