

12. Carefully stop the cart when the 0.10 kg mass hits the floor, and then stop the timer. **Do not let the cart fall off the table.**
13. Remove the tape and label it with the trial number.
14. Use a meterstick to measure the distance the weights fell. Record the *Distance* in your data table.
15. On the tape, measure this distance starting from the first clear dot. Mark the end of this distance. Count the number of dots between the first dot and this mark.
16. Calculate and record the *Time Interval* represented by the number of dots. Fasten a new timing tape to the end of the cart.
17. Replace the 0.10 kg mass in the cart. Remove 0.20 kg from the cart and attach it securely to the end of the cord. Repeat the procedure, label the tape, and record the results in your data table as *Trial 2*.
18. Leave the 0.20 kg mass on the end of the cord and attach the 0.10 kg mass from the cart securely to the end of the cord. Repeat the procedure, label the tape, and record the results in your data table as *Trial 3*.

Constant Force with Varying Mass

19. For the two trials in this part of the experiment, keep 0.30 kg and the counterweight on the string. Be sure to include this mass when recording the total mass for these three trials.
20. Add 0.50 kg to the cart. Tape the mass to the cart to keep it in place. Run the experiment and record the total mass, accelerating mass, accelerating force, distance, and time under *Trial 4* in your data table.
21. Tape 1.00 kg to the cart and repeat the procedure. Record the data under *Trial 5* in your data table.
22. Clean up your work area. Put equipment away as instructed.

ANALYSIS

1. **Analyzing Data** Calculate the *Accelerating Force* for each trial. Use Newton's second law equation, $F = ma$, where $m = \text{Accelerating Mass}$ and $a = a_g$. Enter these values in your data table.
2. **Organizing Data** Use your values for the distance and time to find the acceleration of the cart for each trial, using the equation $\Delta x = \frac{1}{2}a\Delta t^2$ for constantly accelerated motion.
3. **Constructing Graphs** Using the data from *Trials 1–3*, plot a graph of the acceleration of the cart versus the accelerating force. Use a graphing calculator, computer, or graph paper.