Adapted from Take-Home Physics by Michael Horton

Objectives

- Calculate the final speed of a falling object.

Materials

- Marble
- Pie pan
- Stopwatch
- Meter stick

Procedure

We have already learned that

$$\overline{v} = \frac{\Delta x}{\Delta t}$$

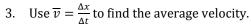and

$$\overline{v} = \frac{v_f + v_0}{2}$$

If the initial velocity is 0 and the acceleration is constant, then

$$\overline{v} = \frac{v_f}{2}$$

1. Solve this for v_f. _____
2. Drop the marble from 1.00 m into a pie pan on the floor. Use to stopwatch to measure the time it takes a marble to fall the distances in the table. Measure each time three times and find the average time.
3. Use $\overline{v} = \frac{\Delta x}{\Delta t}$ to find the average velocity.
4. Use your equation from step 1 to find the final velocity.
5. Which of the following are examples where this method of finding the final velocity will work? If so, find the final velocity.

Distance	Time 1	Time 2	Time 3	Average Time	Average Velocity	Final Velocity
1.00 m						
1.50 m						
2.00 m						

   a. A dragster starts from rest and goes 1000 m in 3 s. _____
   b. A stone is dropped from a 200 m high cliff and hits the ground in 6.4 s. _____
   c. A marble is thrown downward at 10 m/s and falls 2 m in 0.10 s. _____