Worksheet for Exploration 5.6: Air Friction

Two identical balls are dropped. The one on the left is in a resistive medium represented by varying shades of blue. The resistive force is represented as $b \cdot v^n$, where $b$ is a constant between 0 and 2 and $n$ is an integer between 0 and 2 (note that as you vary $n$, the units of $b$ also change). Restart.

Select values for $b$ and $n$, and then click on a graph link to show the motion and that particular graph. When you get a good-looking graph, right-click on it to clone the graph and resize it for a better view.

a. How does your choice of $n$ (0, 1, 2) affect the unit of $b$?

i. Write out each equation for $F_{\text{resistive}} =$, and then solve for $b$'s. Give units.

\[ b_0 \rightarrow \underline{} \]

\[ b_1 \rightarrow \underline{} \]

\[ b_2 \rightarrow \underline{} \]

b. For $b = 1$, how does your choice of $n$ (0, 1, 2) affect the position vs. time graph?
c. For $b = 1$, how does your choice of $n (0, 1, 2)$ affect the velocity vs. time graph?

d. For $b = 1$, how does your choice of $n (0, 1, 2)$ affect the acceleration vs. time graph?

e. For $b = 1$, how does your choice of $n (0, 1, 2)$ affect the terminal velocity?