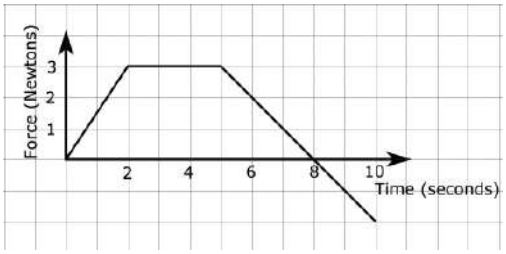
NAME _____ DATE _____

Scenario

A 10 kg box, initially at rest, moves along a smooth horizontal surface. A horizontal force is applied to the box. The magnitude of the force changes as a function of time as shown. Take the positive direction to be to the right.



Data Analysis

PART A: Rank the magnitude of the impulse applied to the box by the force during each 2-second interval indicated below:

A. 0–2 seconds B. 2–4 seconds C. 4–6 seconds D. 6–8 seconds E. 8–10 seconds

Greatest impulse _____ Smallest impulse

PART B: Write a few sentences justifying your reasoning. Use words like speed, velocity, acceleration, time, force, momentum, and impulse.

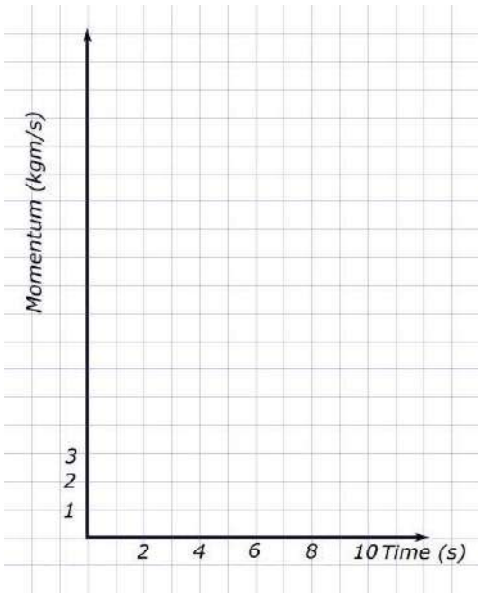
Using Representations

PART C: Re-represent the data given in the force vs. time graph in Part A as a momentum vs. time graph for the same 10 kg box.

Step 1: Identify the equation that relates force and momentum.

Step 2: How can momentum be found from a force vs. time graph?

Step 3: Plot the momentum as a function of time. (Make a table if you need to.)



Quantitative Analysis

Use the graph above to calculate the velocity of the box after 10 seconds.

For each line in the calculation, explain what was done mathematically. The first line is done for you.

$\Delta\vec{p} = m\Delta\vec{v}$	The change in momentum is equal to the mass times the change in velocity.