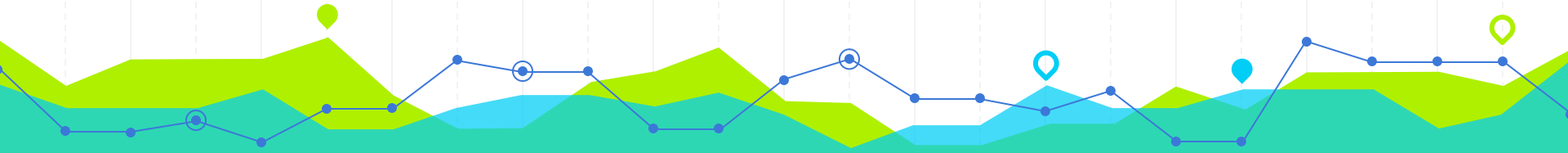


Group 5 -Momentum Investigation

Lily, Giang, Alex, & Donovan

Impulse-Momentum Theorem (B.)

$$F\Delta t = m\Delta V$$

	Maximum Force (N)	Time to Bounce (s)
Thin Hoop Bumper	3.82	0.24
Thick Hoop Bumper	5.73	0.16

$m\Delta V$ is constant between trials (assumptions) => $F\Delta t$ must also be equivalent.

The thin hoop bumper has 'more give' => $\Delta t_{thin} > \Delta t_{thick}$ of the thick hoop. Consequently, the thin hoop's average force =>

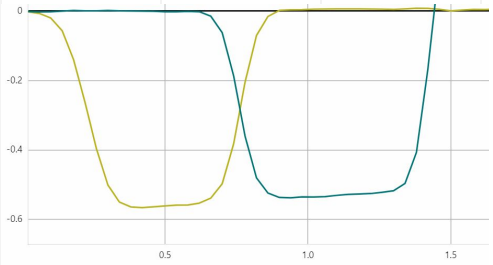
$F_{avg\ thin} < F_{avg\ thick}$

Assume the same, symmetrical distribution of force over time, thus $F_{max\ thin} < F_{max\ thick}$

Conservation of Momentum & Energy (D.)

Trial 1: m_1= m_2= 0.3kg

	v_i	v_f
Green	0	0.53
Blue	0.56	0



Momentum

p_i = mv = 0.3(0.56) = 0.168 N*s

p_f = mv = 0.3(0.53) = 0.159 N*s

5.3% error

Energy

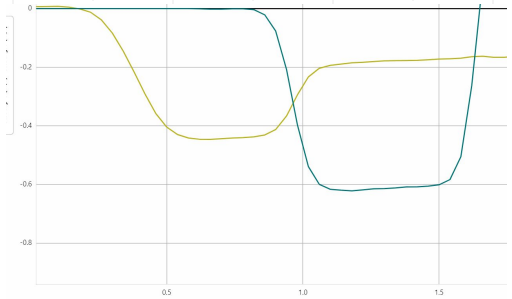
KE_i = 0.5mv^2 = 0.5* 0.3(0.56)^2 = 0.047

KE_f = 0.5mv^2 = 0.5*0.3(0.53)^2 = 0.042

11.9% error

Trial 2: m_1=0.8kg, m_2= 0.3kg

	v_i	v_f
Green	0.444	0.183
Blue	0	0.619



Momentum

p_i = 0.8(0.44) + 0.3(0) = 0.355

p_f = 0.8(0.183) + 0.3(0.619) = 0.332

6.5% error

Energy

KE_i = 0.5(0.8)(0.44)^2 = 0.077

KE_f = 0.5(0.8)(0.183)^2 + 0.5(0.3)(0.619)^2 = 0.071

8.5% error