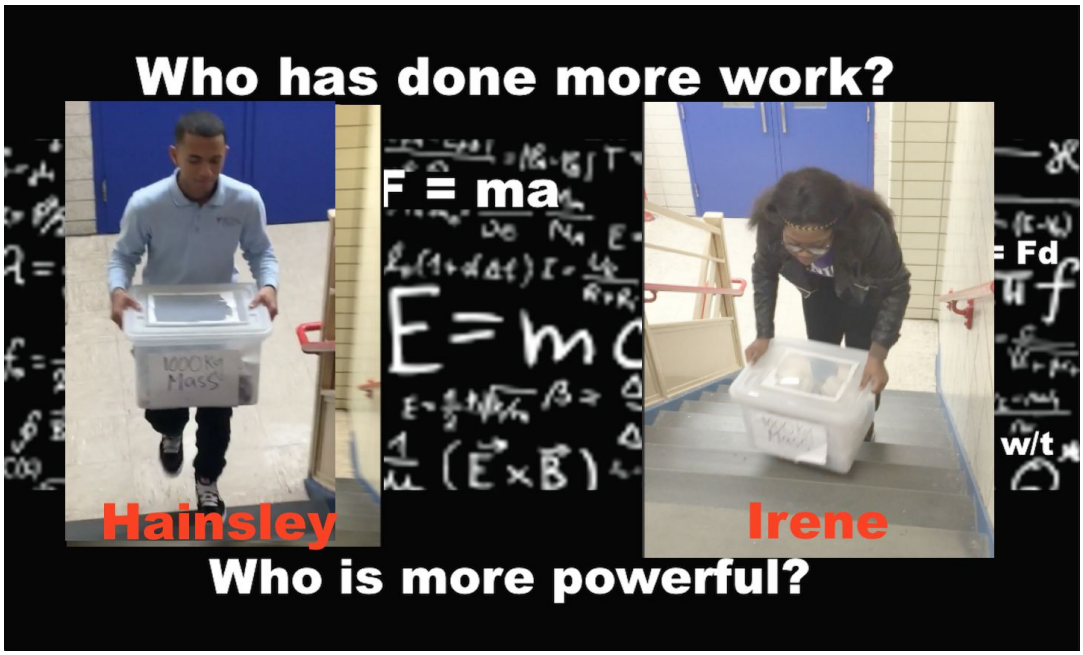
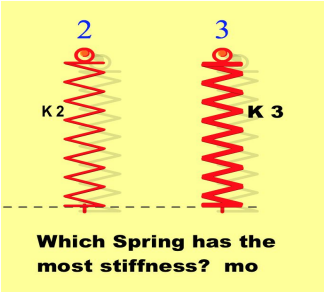
Booklet # 54



NAME: (I will collect the Booklet 5 minutes before the end of the period)

Simulation Lab (25 mins)

Step # 1:

LAB	Make a hypothesis:
	Find the value of K2 and K3. Which spring is stiffer? 

Step # 2:

2	Hang a mass 100 gram onto the **spring # 2**. Use Newton's 2nd Law to find the force (F_2 **)** acting on the mass. Convert Gram to SI Unit.

Step # 3

3	**Use the slider to increase the hardness/stiffness of Spring # 3.** Hang a mass 100 gram to the **spring # 3**. Use Newton's 2nd Law to find the force (F_3 **)** acting on the mass. Convert Gram to SI Unit.

Step # 4:

4	**Use the ruler to measure the displacement (X_2) of Spring 2. Convert CM to SI unit.**

Step # 5:

5	**Use the ruler to measure the displacement (X_3) of Spring 3. Convert CM to SI unit.**

Step # 6:

6	Use Hooke's Law ($F_2 = \mathrm{K}\, X_2$) to find the Stiffness of K_2

Step # 7:

7	Use Hooke's Law ($F_3 = \mathrm{K}\, X_3$) to find the Stiffness of K_3

Step # 8:

8	Accept or reject your hypothesis.

Part II

Work	Energy	Power
A force of 20 newtons pushing an object 5 meters in the direction of the force	How much energy you need to expand to do 100 joules of work?	If you do 100 joules of work in one second, find the power.

	A 14,700 N car is traveling 25 m/s. The brakes are applied suddenly and the car slides to a stop. The average braking force between the tires and the road is 7.10 x 10^3 N. How far will the car slide once the brakes are applied?

How much work can a 500 watt electric mixer do in 3 minutes?			
Data	**Equation**	**Math**	**Answer**

A force of 22 N was used to push a box 8.3 meter along the floor. How much work was done?			
Data	**Equation**	**Math**	**Answer**

What is the Power of a winch that can do 5.2 X 10^3 j of work in 5.35 seconds?			
Data	**Equation**	**Math**	**Answer**

If a crane does 3.91 X 10^5 J of work while lifting a 30 kg crate, how far was the crane raised?			
Data	**Equation**	**Math**	**Answer**

Part III (calculus)

	Deriving Work-energy theorem using Calculus