Physics **Name** _____
Friction Lab Makeup **Date** _____

Objective – Determine the mathematical relationship between force of friction and normal force.

This is the procedure your classmates followed to collect the data. Please see below for theoretical data.

Procedures –

Part A – Block on Wide Side

1. Using the spring scale, measure the weight of the block of wood. This weight will need to be added to find the total mass used in each trial.
2. For the first trial, place a 500 g mass on top of the block of wood. Record the total weight of the block and mass (be sure to convert the mass into Newtons before adding it to the block). Attach the block to the spring scale and do you best to pull the block at a constant velocity. Record this applied force, which also equals the frictional force into data table 1.
3. Continue to follow step 2 as you add 500 g each time to the top of the block. Finish collecting data when you have added a total of 2.5 kg.

Part B – Block on Skinny Side

1. Follow the same procedures as part A, but with the block on its side edge.
2. Record your data in data table 2.

Part C – Block with Sand Paper

1. Follow the same procedures as part A; this time you will have to attach sand paper to the bottom of the block.
2. Record your data in data table 3.

Data –

Data Table 1 – Larger Surface Area

Weight of block *this must be added to the weight of the added masses*	**F_g = F_N (N)**	**F_A = F_F (N)**
	8	**1.5**
	13	**2.5**
	18	**3.5**
	23	**4.5**
	28	**5.5**

Data Table 2 – Smaller Surface Area

Weight of block *this must be added to the weight of the added masses*	**F_g = F_N (N)**	**F_A = F_F (N)**
	8	**1.5**
	13	**2.5**
	18	**3.5**
	23	**4.5**
	28	**5.5**

Data Table 3 – Sand Paper

Weight of block *this must be added to the weight of the added masses*	$F_g = F_N$ (N)	$F_A = F_F$ (N)
	8	**3**
	13	**6**
	18	**9**
	23	**12**
	28	**15**

Analysis & Conclusions –

1. Draw a free-body diagram (force diagram), which depicts all the forces that act on the block as it was pulled at constant velocity.

2. **Describe the resulting curve** (proportionality from orange sheet) and **draw a sketch**. Write the **translated equation**.

   Part A (Data Table 1)

   Part B (Data Table 2)

   Part C (Data Table 3)

3. According to your data and observations what doesn't friction depend on? *Look at your data tables, graphs and equations for assistance!*

4. According to your data and observations what does friction depend on? *Look at your data tables, graphs and equations for assistance!*

5. Why was it harder to move the block in part C?

6. What frictional force is the greatest, the one that exists when you first try to move an object or the one that exists once the object is already moving?