"Getting Pushy"
Newton's Second Law of Motion

Purpose: To explore and use the relationship between force, mass and acceleration and to investigate the amount of acceleration or an object when a net force is acting on it.

Procedure:

1. Mark off 0 m, 5 m, 10 m, and 15 m intervals with tape on the floor.

2. One person will pull the skater with a constant force shown by the spring scale when the skater holds one end and the puller holds the other. Another person must hold the skater from behind to keep him from being pulled away from the 0 m mark before the timer is ready. <u>It is very important for the force to be constant and enough to overcome friction! Do not Pull harder to "get going".</u>

3. Time the skater to the 5 m mark. Stop and go back to the start and time the skater to the 10 m mark, and then go back and do the same for 15 m. Keeping the same force for all three distances. Record the force used and the time in Data Table 1.

4. Decide on a different force to use and repeat step 3 using this new constant force. Record This force and the time in data table 2.

5. Switch to a new skater that has a different mass than the first and repeat steps 3 & 4 with The new skater.

6. Calculate the speed for each trial and record it in the calculations table.

"GETTING PUSHY" NAME ____________________

Data Table 1

Skater # 1 (Name)	Distance (m)	Force (N)	Time (s)
	5.0		
	10.0		
	15.0		
Skater # 2	5.0		
	10.0		
	15.0		

Data Table 2

Trial	Distance (m)	Force (N)	Time (s)
Skater #1	5.0		
	10.0		
	15.0		
Skater #2	5.0		
	10.0		
	15.0		

Calculations Table: $V = d / t$

Trial Data 1	Distance (m)	Speed (m/s)
Skater 1	To 5.0 m	
	10.0	
	15.0	
Skater 2	To 5.0	
	10.0	
	15.0	

Trial Data 2	Distance (m)	Speed (m/s)
Skater 1	To 5.0	
	10.0	
	15.0	
Skater 2	To 5.0	
	10.0	
	15.0	

Analysis:

1. Does your experience and data in this lab show that Newton was correct or not? Use an example from your lab to show that it is correct.

2. What happens to the speed as the skater went farther?

3. What was the main problem that you had to overcome?

4. Until the time of Galileo and Newton, people thought that a constant force was required to produce a constant speed. Do your observations confirm or reject this idea? Use an example to explain.

5. Suppose you applied a 5 N force and the skater did not move. How would you explain this?

6. When the force is the same and the mass is greater, what happens too the speed reached by the skater?

7. When the force is greater and the mass is the same, what happens to the speed reached by the
Skater?