Name:_____ Period _____ Date _____

Getting Pushy

Purpose: To investigate the relationship between mass, force, and acceleration.

Materials: spring balance, stopwatch, meter stick and tape, long board

Procedure:

Step 1. With pieces of tape, mark positions on the floor at intervals of 0 m, 2 m, 4m, and 6 m. The path along the floor should be smooth, straight, and level.

Step 2. A student must sit on the longboard and move to the 0 meter mark. Another student must stand in front the 0 meter mark and holds a spring scale. The skater holds a spring balance by its hook.

Step 3. The third and fourth members will be recording the time in which it takes to complete the distance.

Step 4. Repeat the experiment with a different constant force. If the results are inconsistent, the person may not be holding the scale parallel or may be trying to change directions slightly during the trial.

Step 5. Repeat with a different rider to change the mass.

TRIAL #	DISTANCE (m)	FORCE (N)	TIME (sec)	Velocity (m/s)
Person 1 Force 1	2			
	4			
	6			
Person 1 Force 2	2			
	4			
	6			
Person 2 Force 1	2			
	4			
	6			
Person 2 Force 2	2			
	4			
	6			

Name:_____ Period _____ Date _____

ANALYSIS:

1. Until the time of Galileo, people believed that a constant force is required to produce a constant speed. Do your observations confirm or reject this notion?

2. What happens to the speed as you proceed farther and farther along the measured distances?

3. What happens to the rate of increase in speed –the acceleration—as you process farther and farther along the measured distances?

4. When the force is the same (constant), how does the acceleration depend upon the mass?

5. When the mass of the skater is the same, how does the acceleration depend upon the force?

6. Suppose a 3-N force is applied to the skater and no movement results. How can this be explained?