FLINN SCIENTIFIC

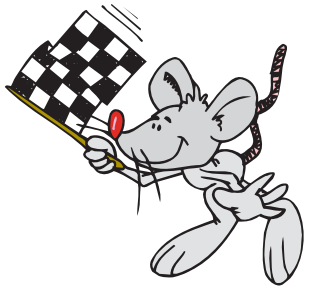
Name_____

Mousetrap Cars Worksheet

A. Lever Arm Observations

Complete the following "If/then" hypothesis to explain how the length of the lever arm will influence the amount of force required to lift the lever to a 90-degree angle.

"If the length of the lever arm decreases, then the amount of force required to tighten the spring should (increase/decrease/stay the same) because _____."



Data Table A. Lever Arm

Eyelet	Distance from Fulcrum (cm)	Force (N)
#1		
#2		
#3		

B. Wheel Diameter Observations

Data Table B. Wheel Diameter

	Time to Travel 4 Meters (s)			
Wheel Diameter	Trial 1	Trial 2	Trial 3	Average
Small				
Large				

C. Hub Diameter Observations

Data Table C. Hub Diameter

	Time to Travel 4 Meters (s)			
Hub Diameter	Trial 1	Trial 2	Trial 3	Average
Small				
Large				

D. Going Further

Predict how changing the point of force from eyelet #1 to the middle eyelet on the lever arm (closer to the fulcrum) will affect the car's performance over a 4-meter distance. Write your prediction as an "If/then" statement (see the prediction in Part A as an example).

Post-Lab Questions and Calculations

1. Consider a placement of the spring scale on the lever arm at the first bend between the spring and eyelet #3.
   a. Predict how the force would compare to the force recorded at eyelet #3.

   b. Explain the reasoning for your answer.

2. Calculate the average time for each trial and record the average in the data tables.
   a. Explain the effect the diameter of the wheel has on the speed of the car over a 4-meter distance.

   b. Explain the effect the diameter of the hub has on the speed of the car over a 4-meter distance.

3. Consider the amount of potential energy stored in the spring when the lever arm is pulled all the way back.
   a. Does the eyelet that is used in pulling the lever arm back affect the amount of potential energy stored in the spring?

   b. Explain your reasoning for your answer.

4. Consider a mousetrap car designed to win a short race in the fastest time.
   a. Which point of force on the lever arm would you choose?

   b. Explain your choice.

   c. Which set of rear wheels would you use?

   d. Explain your choice of wheels.

   e. Which hub diameter would you choose?

   f. Explain your choice.