Name _____ Partner(s) _____ Date _____

Inclined Plane Lab

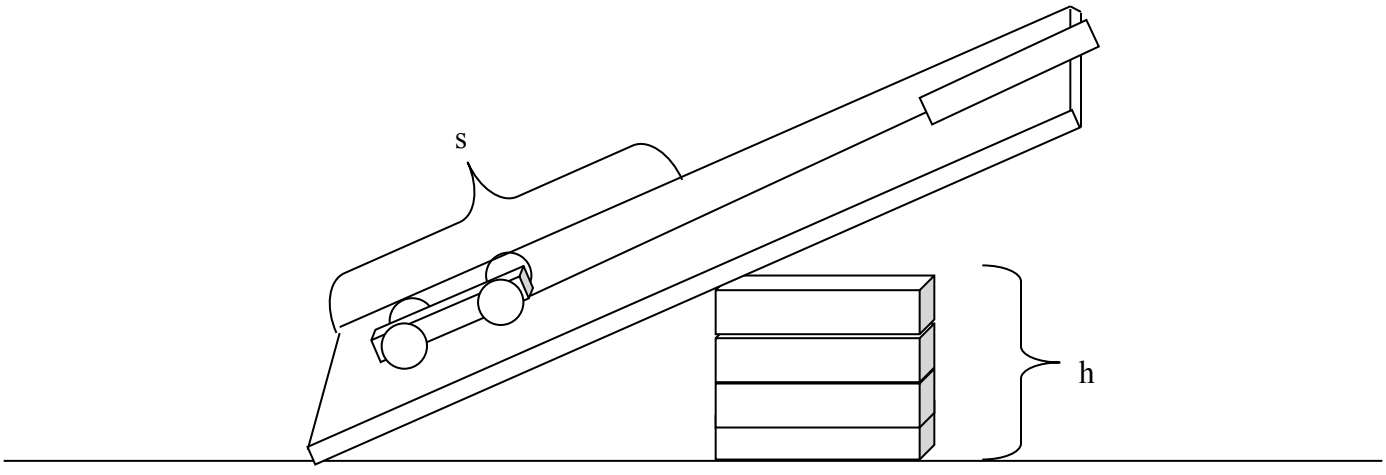
Background:
A simple machine is used to reduce the force (not decrease the amount of work): exerting a smaller force over a bigger distance. The amount of work put into a machine always equals the amount of put out of the machine (remember work = change in energy and the Law of Conservation of Energy). An inclined plane is a simple machine consisting of a sloping surface used to alter the effort and distance involved in doing work to lift a load. It is easier (takes less force) to push a heavy load up a long incline or ramp than it is to lift it directly straight up.

Procedure:
1. Set up the incline on the ring stand as shown in the diagram using bricks, books or other objects to give the inclined plane height (s_{out}).

2. Determine the weight of the cart. It should weigh **at least 10 N**. (F_{out})

3. Gather Data & record in table.
   a) using a meter stick, determine the length of the incline (s_{in})
   b) using a meter stick, determine the vertical height the incline lifts the cart (s_{out})
   c) attach a spring scale to the cart and pull it up the incline at a constant velocity, record the force needed to pull the cart up the incline (F_{in})
4. Change the distance for the incline three times & gather the same data in step 3.

5. Repeat steps 1 – 4 three more times with different heights.



F_{out}	F_{in}	s_{out}	s_{in}	Work $_{out}$	Work $_{in}$	AMA	IMA	% Efficiency

Summary:

1. In general, what occurs with the F_{in} as the s_{in} decreases (slope increases)?

2. In general, how does the work to lift the cart directly compare to the work to pull it up the ramp?

3. Theoretically, how should these two quantities (W_{out} & W_{in}) compare? WHY?

4. What accounts for any differences in your answers to question # 2 & 3?

5. What does IMA mean?

6. In general, what occurs to the IMA as the length (s_{in}) increases?

7. What does AMA mean?

8. In general, how does the IMA compare to the AMA? WHY?

9. What does % efficiency mean? What occurs to the incline's efficiency as the slope increases? WHY?