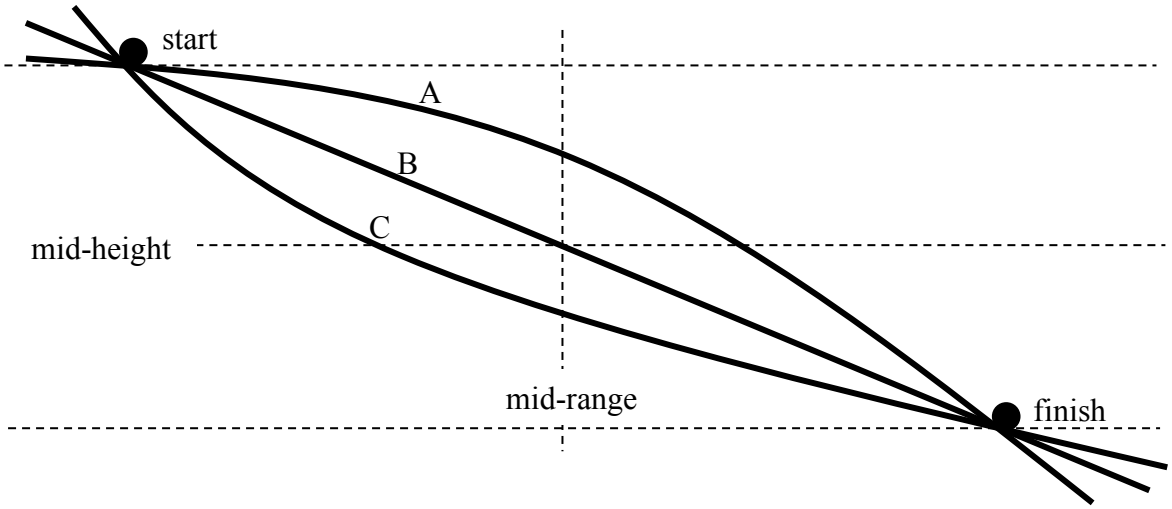
Energy Storage and Transfer Model:
Review Sheet

Name_____
Date_____ **Mod**__

1. Three balls are rolled down three tracks starting from rest at the point marked "start."



a. Describe the acceleration of the ball traveling on track A.

b. Describe the acceleration of the ball traveling on track B.

c. Describe the acceleration of the ball traveling on track C.

d. Describe the velocity of the ball traveling on track A.

e. Describe the velocity of the ball traveling on track B.

f. Describe the velocity of the ball traveling on track C.

g. Rank the time needed for the balls to travel from start to finish. Explain your ranking.

shortest:____ ____ _____:longest

h. Rank the instantaneous velocities of the balls at the mid-height line.
Explain your ranking.

shortest:____ ____ _____:longest

i. Rank the instantaneous velocities of the balls at the mid-range line. Explain your ranking.

shortest:____ ____ _____:longest

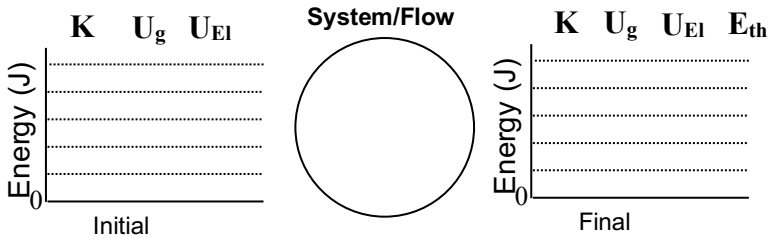
j. Rank the instantaneous velocities of the balls at the finish point. Explain your ranking.

shortest:____ ____ _____:longest

k. If the start is 1.0 m higher than the finish, determine the heights at which A, B, and C will have half of their final kinetic energy.

l. If the start is 1.0 m higher than the finish, determine the heights at which A, B, and C will have half of their final velocity.

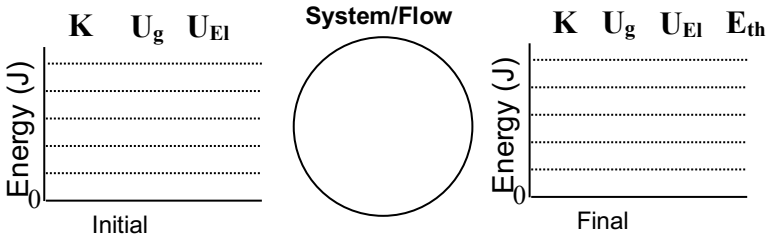
2. A baseball (m = 140 g) traveling at 30 m/s moves a fielder's glove backward 35 cm when the ball is caught.
   a. Construct an energy bar graph of the situation, with only the ball and Earth in the system.



   b. How large is the average force exerted by the ball on the glove?

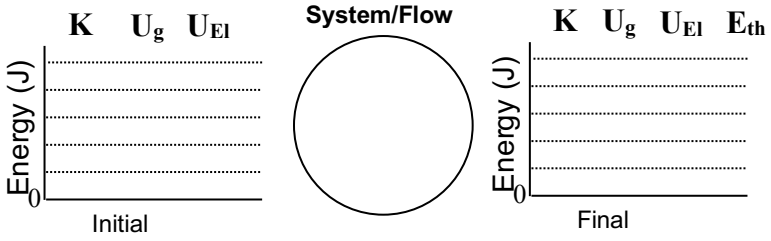
3. A spring whose spring constant is 850 N/m is compressed 0.40 m. What is the maximum speed it can give to a 500 g ball?

4. A bullet with a mass of ten grams is fired from a rifle with a barrel that is 85 cm long.
   a. Do an energy bar graph analysis of the situation.



   b. Assuming that the force exerted by the expanding gas to be a constant 5500 N, what speed would the bullet reach?

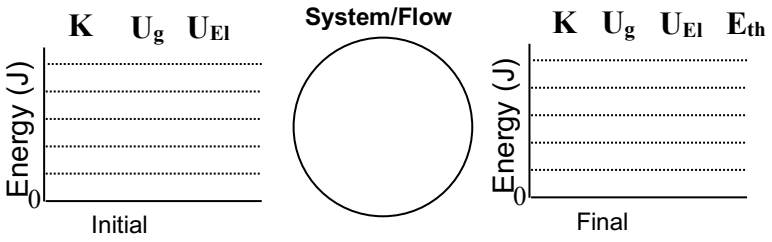
5. A 24 kg child descends a 5.0 m high slide and reaches the ground with a speed of 2.8 m/s.
   a. Do a bar graph analysis for this situation.



   b. How much energy was transferred to the thermal account due to friction in the process?

6. A 1500 kg car is traveling at 20 m/s.
   a. Calculate the E_k of the car relative to the road.

   b. If the average braking force applied to the car is 6000 N, how far would it travel before it came to a stop? (Draw an energy bar graph of the situation.)



   c. If this same average braking force were applied to the car moving at twice the speed, what would be the stopping distance?