Name _____ Hour _____

Work, Power, and Energy Problems- Level 2

1. Calculate the kinetic energy of a 4 kg toy car moving at 5 m/s. (50 J)

2. If it took the 4 kg toy car from #1 above a force of 20 N to accelerate from rest to the 5 m/s, over what distance did the force act? *(Find a, then Δx. answer = 2.5 m)*

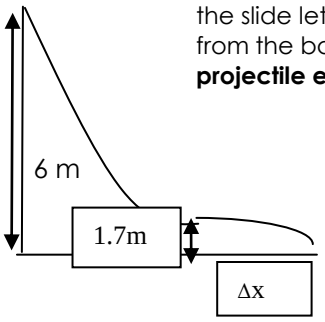
3. A 77 kg diver drops from a board that is 10.0 meters above the water's surface.
   a. Find the speed of the diver **after falling for 4 meters**: (8.85 m/s)

Before you start… what is **Δy**? _____ $\mathbf{h_i}$? _____ $\mathbf{h_f}$? _____

Conservation of energy: **1-D motion equations:**

   b. If it takes him 8.2 sec to climb the stairs on the way up (10 m), how much **work** did he do and what is his **horsepower**? (-7546 J, -1.23 hp)

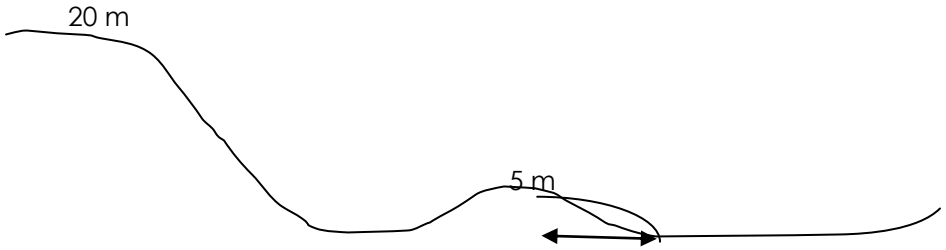
   c. The same 77 kg person decides to go off a slide with a starting height of 6.0 m. If the slide lets out horizontally at 1.7 m above the surface of the water, how far (Δx) from the base of the slide will he land? **Find V_f using energy first, then plug into projectile equations to find Δt and Δx.** (V_f=9.2 m/s, Δt=0.59 sec, Δx=5.4 m)



Name _____ Hour _____

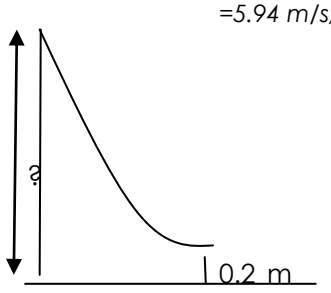
4. A 150 **gram** pendulum starts at a height of 0.95 m. How much **kinetic energy** does it have at the bottom of its swing? (Find Vf using CE, then KE) (1.4 J)

5. Bryce (m=68 kg) was sledding.
   a. Find his speed at the top of the second hill using CE. (17.1 m/s)

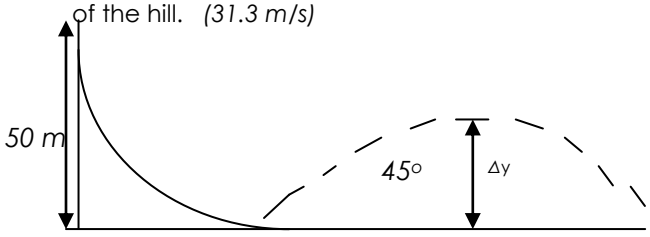


   b. If Bryce left the second hill like a horizontal projectile, how far away would he land? (17.3 m)

6. A child slides down a slide that ends 0.2 meters off the ground. Calculate how high the slide is to start if she lands 1.2 m away when she leaves like a horizontal projectile. **Find time first, then V_x, then h_i. (Similar to 2d but backwards)** *(Δt=0.202 sec, V_x (same as V_f) =5.94 m/s, h_i=2.0 m)*



7. a. A 75 kg skier starts at rest at the top of a 50 m hill. Find the skier's velocity at the bottom of the hill. *(31.3 m/s)*



   b. If he hits a ramp and flies off at a 45° N of E, what will be his potential energy at his maximum height? (The 31.3 m/s from above is your hypotenuse!) (≈18,290 J)