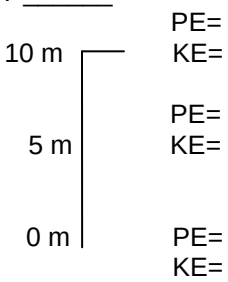
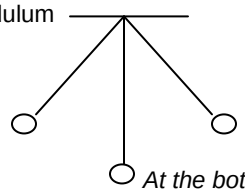
Name _____ Hour _____

Energy Problems- Level 1

1. What is kinetic energy? _____
2. What is potential energy? _____
3. What is the unit for energy? _____
4. If you are not moving, what is your kinetic energy? _____
5. If you are standing on the ground, what is your potential energy? _____
6. If you double the height you are off of the ground, what happens to your potential energy? _____
7. If you double the speed you are traveling at, what happens to your kinetic energy? _____ (Be careful!)
8. Fill in the blanks with the correct PE and KE for the picture on the right if the person standing on top has a mass of 75 kg and dives off.



9. If you start off with 5 J of K.E. and lose 2 J of K.E., how much P.E. will you gain? _____
10. Fill in the energy values for the swinging pendulum



It stops at the top.
PE = _10_ J
KE = ___ J

It stops at the top again.
PE = ____ J
KE = ___ J

At the bottom, h= 0 m.
PE = ___ J
KE = ____ J

11. A 10-lb. bowling ball moves at 3 m/s.
    a. How much K.E. does it have? *(ans. 20.5 J)*

    b. How fast must a 2.45-g ping pong ball move to have the same K.E.? *(129 m/s)*

12. A child slides down a slide that is 2 meters high. Use the conservation of energy to calculate his speed at the bottom assuming he started from rest at the top. *(ans. 6.3 m/s)*
    (If you do not know how to do this, look in your notes)

G: hi=
hf=
vi=
U: vf=
E: $mgh_i + \frac{1}{2} mv_i^2 = mgh_f + \frac{1}{2} mv_f^2$ *Remember the mass cancels out.*
$gh_i + \frac{1}{2} v_i^2 = gh_f + \frac{1}{2} v_f^2$

Name _____ Hour _____

Projectile Motion Review

We will be combining Energy/ Work with Projectile Motion!

Horizontal Projectiles: V_{iy} = ____**0**_____ a_y = ___**-9.8 m/sec²**____ **Do NOT cut the time in ½!**

The Vx is __**constant**____ because **we neglect air resistance (no a)**

These 2 equations work for horizontal projectiles:

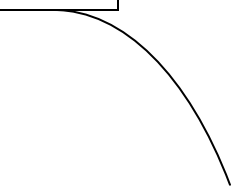
$$v_x = \Delta x / \Delta t \qquad \Delta y = v_{iY}\Delta t + 1/2 a_Y \Delta t^2$$

Angled Projectiles: At the very beginning, the actual velocity is a combination of the Vx and Viy. At the ½ way point, you can use the $a_y = V_{fy} - V_{iy} / \Delta t$ because V_{fy} = ___**0**___

You need to sketch what is happening so you know what time to use!

1. A cargo plane is flying **horizontally** at 40 m/s at 125 m above the ground. If a package falls out the back of the plane, how many meters will it travel horizontally before landing? *(≈ 202 m)*
   1. Use Δy equation to find Δt (Viy = 0!) 2. Use Vx = Δx / Δt to find Δx

H or A



2. A skier goes off a ramp with a **velocity of 20 m/s at 40° N of E.**
   a. What will his maximum height be off the ground? *(≈ 8.4 m)*
      1. Find Viy and Vx 2. Use a_y= equation to find Δt at ½ way pt 3. Find Δy at ½ way pt

H or A

   b. How far away will he land horizontally? *(≈ 40 m)*
      Vx = Δx / Δt … but you need Δt all the way at the end!