Name: _____ Period: _____ Date: _____

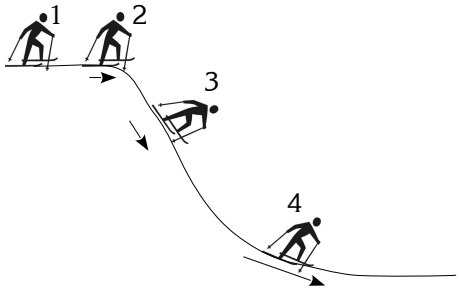
Energy Review 1

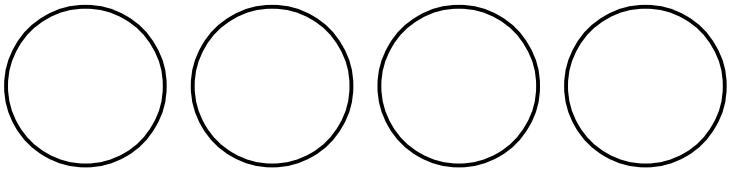
$$E_i + W = E_f \qquad W = F \cdot d \qquad KE = \frac{1}{2} \cdot m \cdot v^2 \qquad GPE = m \cdot g \cdot y \qquad EPE = \frac{1}{2} \cdot k \cdot \Delta x^2$$

Draw energy pie graphs

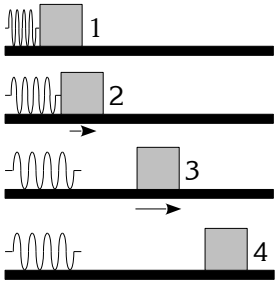
These questions don't involve numbers. You just need to think about the situation and draw pie graphs showing the changing energy types.

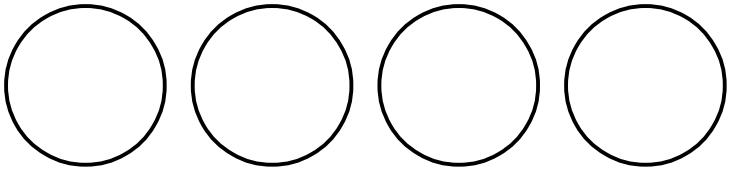
1) A skier is standing still near the edge of a slope (1). She gets herself moving a bit to approach the edge (2) and then she goes over, picking up speed as she skis down the slope (3, 4). The snow is very slippery, so you can ignore friction.



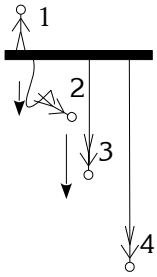


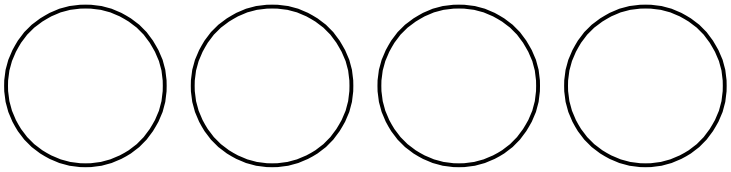
2) A block is pressed up against a compressed spring (1). The block is released, so the spring gradually pushes out (2), moving the block away. The block slides away from the spring (3) and comes to a stop a short distance away (4).



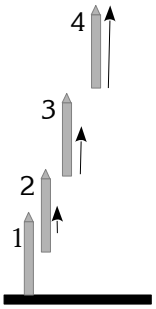


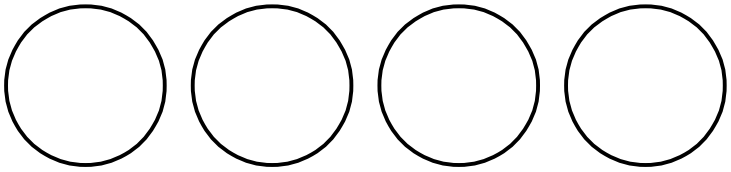
3) A bungee jumper is standing at the top of a bridge (1). She falls over the edge (2). When she reaches the end of her bungee cord, the cord starts to stretch (3), slowing her down as she descends to her lowest point (4).





4) A Space X rocket is sitting on the launch pad, ready to go (1). Then, it begins firing its engines and takes off, gaining altitude and speed (2, 3). Eventually it runs out of fuel when it is very high and fast (4).

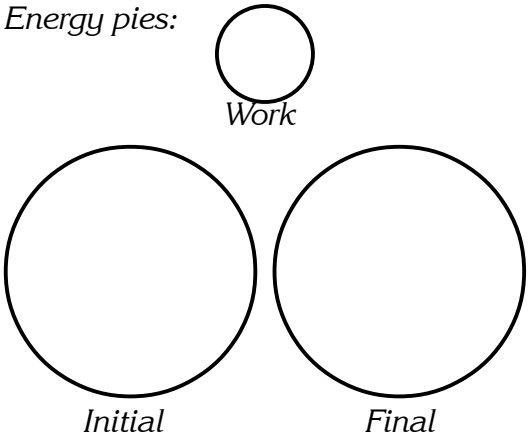




Do calculations – if W, E_i, or E_f is ZERO, you can cross it out!

5) A pendulum with a 0.050 kg mass is held at a height of 0.040 m, then released. How fast will it be moving when it has a height of 0.030 m?

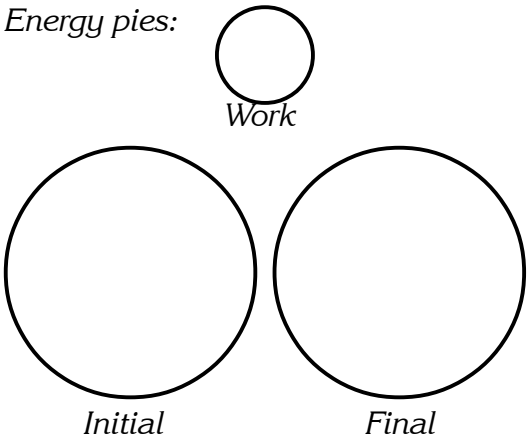
Energy pies:



Calculations:

6) You push a 2.40 kg block along a rough surface, using +51.0 N of force over +0.250 m. After you let go, it slides a bit more and then runs into a spring. The total thermal energy generated from friction is 3.92 J. If the spring constant is 150. N/m, how far will the spring compress?

Energy pies:



Calculations:

Prelab problem

7) You will need to use motion/projectile techniques to get started on this question! Energy doesn't come in until part C:

   A 0.0200 kg ball is at the top of a small, curved track, which itself sits on a tabletop. The table is 1.15 m above the floor, and the ball starts 0.230 m above the tabletop. The ball is released. It rolls down the track, then off the table with a horizontal velocity. It lands on the floor 0.421 m from the edge of the table.

   A) How much time would it take for the ball to fall from the tabletop to the floor?
   B) Based on that time and the horizontal distance it moved while falling, what was the ball's velocity when it left the table?
   C) Do an energy analysis to find out how much energy was "lost" to thermal and sound energies <u>as the ball rolled down the track</u>. (Initial: motionless ball at top of track, final: ball at bottom of track with horizontal velocity.)