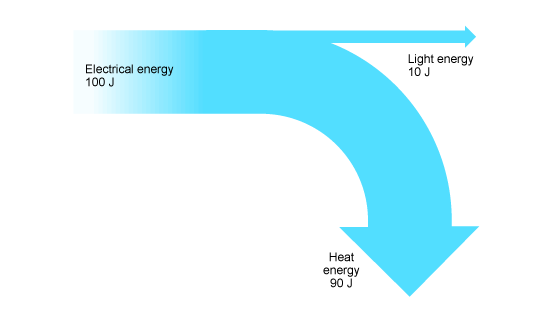
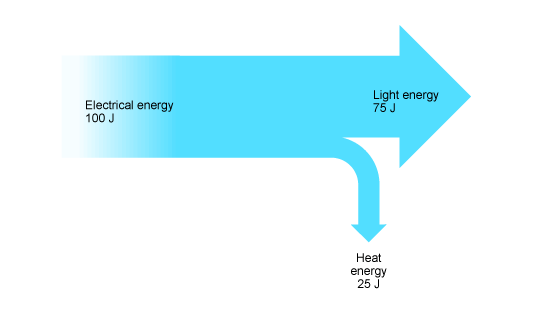
Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

**Law of Conservation of Energy – Practice Problems**

1. An "old style" (incandescent) light bulb converts energy as shown in the Sankey diagram below:
   1. For every 100J of energy that the light uses, how much is converted into light energy?
   2. For every 100J of energy that the light uses, how much is converted into heat energy?
   3. We'd consider the "useful energy" to be what?
   4. We'd consider the "wasted energy" to be what?
   5. Calculate the efficiency of the light.
   6. If you were going to use this light bulb to heat a small area, we'd have to redefine what was "useful energy."   What would be the efficiency of the light in this case?
2. An "new style" (LED) light bulb converts energy as shown below:



* 1. For every 100J of energy that the light uses, how much is converted into light energy?
  2. For every 100J of energy that the light uses, how much is converted into heat energy?
  3. We'd consider the "useful energy" to be what?
  4. We'd consider the "wasted energy" to be what?
  5. Calculate the efficiency of the light.
  6. If you were going to use this light bulb to heat a small area, what would be the efficiency of the light?

1. A roller coaster uses 1 000 000 J of energy (Work in) to get to the top of the first hill.   During this climb, it gains 400 000 J of potential energy and pauses (velocity = 0) for a fraction of a second at the very top before heading down the other side.
   1. What's the kinetic energy at the very top?
   2. What would be the "useful energy" during it's climb to the top?
   3. How much energy was lost due to friction? (Use Ebefore = Eafter).
   4. Calculate the efficiency of the roller coaster during this part of the ride (the climb).
2. The same roller coaster goes over the top of the first hill and heads downwards.  The roller coaster heads down and levels out as it hits the original level.
   1. Since they are back at the original level, what do we know about the potential energy at this point?
   2. If we assumed that there is no loss due to friction, what would be the kinetic energy at the bottom?  (Use Ebefore = Eafter)
   3. The actual kinetic energy at the bottom turned out to be 240 000J, what is the efficiency of the roller coaster during this part of the ride?
   4. Where would the wasted energy have gone?