**Conservation of Energy**

**Name and section number:**

**Partner’s name and section number:**

1. Make free-body diagrams of a mass oscillating up and down on the end of a spring for three situations. Label the forces using mg and ky, the spring force. Also indicate if the situation could correspond to the top, middle, or bottom of the oscillation.

Equilibrium

Accelerating up

Accelerating down

2. If the zero for the potentials is the position of the mass when the spring is unstretched, write the gravitational and spring potentials and kinetic energies for the top, middle, and bottom positions when the mass is oscillating around its equilibrium position using m, g, yt, ym, yb, vm, and k. The subscripts refer to the top, middle, and bottom of the oscillation.

Top: Ug = Middle: Ug = Bottom: Ug =

Us = Us = Us =

K = K = K =

3. Use the information above to write the total mechanical energy for each situation.

Etop = Emiddle = Ebottom =

4. Insert into this box the annotated y(t) graph from Logger Pro, with data and boxes legible.

5. Insert into this space the outlined data from the spreadsheet.

6. Insert into this box the E(t) graph from the spreadsheet.

7. *Individually* report your result for E(t) in standard form. State whether or not mechanical energy is conserved and how the E(t) graph supports your conclusion. Describe how energy is converted from one form to another.