Recitation Activity: Forces and Energy

1. For gravitational and electrostatic forces: Discuss what aspects are the same for each force and what are different. Be sure to indicate how the forces are different.

Same for both gravitational and electrostatic	Different for gravitational and electrostatic

2. You have an isolated system of two masses.

a. Draw a graph to show how **gravitational force** changes with distance between the two masses. Be sure to label your axes. Attractive forces are + and repulsive forces are –

2b. Now draw a graph to show how the **potential energy** of the system changes with distance between the same two masses. Be sure to label your axes. We will define the potential energy of the two masses at a great distance (where they don't interact) as 0.

2c. Explain in words what is happening to the potential energy as the two masses move together. Why does the potential energy change in this way?

2d. Since the system is isolated, what do you think will happen to the kinetic energy as the potential energy changes?

3a. Now you have an isolated system consisting of two **oppositely charged species**

a. Draw a graph to show how **electrostatic force** changes with distance between two **oppositely charged species**. Be sure to label your axes. Attractive forces are + and repulsive forces are –

3b. Now draw a graph to show how the **potential energy** of the system changes with distance between the t**wo opposite charged species**. Be sure to label your axes. We will define the potential energy of the two charged objects at a great distance (where they don't interact) as 0.

3c. Explain in words what is happening to the potential energy as the two opposite charged species move together. Why does the potential energy change in this way?

3d. Since the system is isolated, what do you think will happen to the kinetic energy as the potential energy changes?

4a. Now you have an isolated system consisting of two **charged species** of the same sign

a. Draw a graph to show how **electrostatic force** changes with distance between t**wo charged species of the same sign**.

4b. Now draw a graph to show how the **potential energy** of the system changes with distance between the t**wo charged species of the same sign**. Be sure to label your axes

4c. Explain in words what is happening to the potential energy as the t**wo charged species of the same sign** move together. Why does the potential energy change in this way?

4d. Since the system is isolated, what do you think will happen to the kinetic energy as the potential energy changes?

5. Why do you think the potential energy graphs 3b and 4b look different? Explain