Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Photoelectric Effect Simulation

1. Go to the PhET website. Choose >Play with sims >Physics >Light & Radiation > Photoelectric Effect.
2. Set the intensity to 50%.
   * What is the current? \_\_\_\_\_\_\_\_
   * Define intensity for this simulation.
   * Does every electron “kicked out” out of the metal cross the gap between plates? Why/why not?
3. Leave the intensity at 50% and the wavelength at 400 nm. Change the voltage to -3.00 volts.
   * Explain what this change in potential difference means in this model.
   * Why is there no current?
   * Predict: Will increasing the intensity at the same wavelength and potential difference cause a current to flow? Why or why not? (use sim to check prediction)
   * Is the work function still met (at 400 nm, -3.00 V and 50% intensity)? What is your evidence?
   * Predict: What setting can you change to cause a current? (explain two answers, then use sim to check prediction)
4. Click to open all three graphs. Use sodium as your metal. Set the potential difference to 2.00 volts and the wavelength to 345 nm (in the UV region).
   * Slide the intensity from 0%-100%. Sketch the Current vs. Intensity graph. Explain this graph. (this means define the axes and use the model to support the relationship shown on the graph)
   * Return the intensity to 50%. Slide the wavelength across the spectrum. Sketch the graph of Energy vs. Frequency below. Explain this graph. Additionally, show a calculation for the slope of this graph. What does the slope represent? What does the y-intercept represent? Write the equation for this graph.
   * Return the wavelength the 345 nm. Slide the potential difference from -8.00 volts to +8.00 volts. Sketch the graph of Current vs. Voltage below. Explain the graph. What does the x-intercept represent? What is stopping voltage a measure of?
5. Determine which of the metals has the greatest work function. Outline your method below including what variables you held constant and how you changed other variables. Check your answer with 2 other students.
6. Find a student with a different method and have them explain their thinking to you. They can use the model to show you their process. Ask them at least one question about their process to push their thinking. Initial their paper here\_\_\_\_\_\_ when they have given an adequate explanation. Be sure to explain your process to another student and have them initial above on this paper
7. Figure out the work function for the unknown metal (????). Use the internet to determine what this metal is. Check your answer with two other students.
8. Write your own question that could be answered using this simulation. Have a fellow student show you how to use the simulation to answer your question. When the student has demonstrated sufficient knowledge of the photoelectric effect, initial their paper here\_\_\_\_\_\_. Be sure to answer someone else’s question and get their initials as well.