**Introduction to the *PhET* Photoelectric Effect Simulation (Playing around with staff).**

*The simulation can be downloaded from:* <https://phet.colorado.edu/en/simulation/legacy/photoelectric>

1. Choose you target metal to be *Sodium,* then set its *Intensity/ Number of photons* to 100%. Ensure that the battery voltage is 0.00V. By adjusting the wavelength of the light find the cut-off frequency. [5]

Answer: $f\_{0}$ = \_\_\_\_\_$5.56x10^{14}Hz$\_\_\_\_\_. (*you may find this equation useful:* $f\_{0}=\frac{c}{λ\_{0}} $).

1. By only changing the target metal, which metal has a cut-off frequency of$ 1.1364x10^{15}Hz$? (*you may find this equation useful:* $f\_{0}=\frac{c}{λ\_{0}} $). [5]

Answer: Metal is \_\_Copper\_\_\_\_.

1. Using copper as your metal surface, what is the current through the circuit for ultra-violet light of wavelength 200nm. [2]

Answer: *I* = \_\_\_1.053A\_\_\_\_\_.

1. a) Using copper as your metal surface, what is the current through the circuit for green light of wavelength 530nm, with only 50% intensity. [2]

Answer: *I* = \_\_\_0.000A\_\_\_\_\_.

b) What is the current when the intensity is 100%? Why is this the case? (*Think about the cut-off frequency (*$f\_{0}$*)*). [4]

Answer: *I* = \_\_\_0.000A\_\_\_\_\_. The reason for this is that the wavelength is higher than the “cut-off wavelength”. OR The frequency is lower than the cut-off frequency of the metal.

1. Using calcium as your target metal, set an ultra-violet wavelength of 130nm. What is the current through the circuit? Plot a graph of “Electron energy vs light frequency” and take a screenshot of it. [3]

Answer: *I* = 7.500A. **+**