PreAP Physics

Ms. Zimmer

Lesson Title:	**Photoelectric Effect Lab**
Standards (TEKS)	8A
Learning Objective:	• Describe the photoelectric effect by explaining relationship between frequency of light and the number of electrons emitted. • Explain the essential components needed to conduct an experiment to study the photoelectric effect.
Assessment:	Conclusion Paragraph

AGENDA	KEY POINTS
1. PHET Photoelectric Simulation 2. Conclusion	• Different atoms have electrons that are different distances away from the nucleus. • Depending on how far the electrons are away from the nucleus, they can have different levels of energy. • Light is a form of energy that we can use to move electrons. The color of the light relates to the amount of energy the electron will have. • When photons are incident upon the materials, if they have enough energy, they can eject electrons from the atoms of the material.

Time	**Learning Activity**
30	*Teacher note – this lab is meant to show a surface level understanding of the photoelectric effect. Equations are not used in this lab and is meant to be more qualitative.* Students begin by opening the PhET sim and making preliminary predictions. Part 1 – Components of Photoelectric Effect Students will change the wavelength of the light until electrons move across the screen. They will draw what they see on the screen on their paper and label the key components. Part 2 – What determines if electrons are liberated from the surface? Students will investigate how the wavelength of the incident light determines if electrons are ejected. They will hypothesize why this is the case. Part 3 – How can we change the number of electrons liberated from the surface? Students will determine that changing the intensity of the light influences how many electrons will be liberated from the surface. Guiding Questions 1. What happens in the simulation as you change the light from red to blue? 2. Suppose that red light does not eject electrons for the metal you are studying, would changing the intensity of the light allow electrons to be ejected? Explain. 3. What property of the light changes as its wavelength changes? 4. Why do different metals have different threshold frequencies? 5. If a metal has a high threshold frequency, what property do you think it has?
15	Students will write a conclusion based on their experiences in the lab.