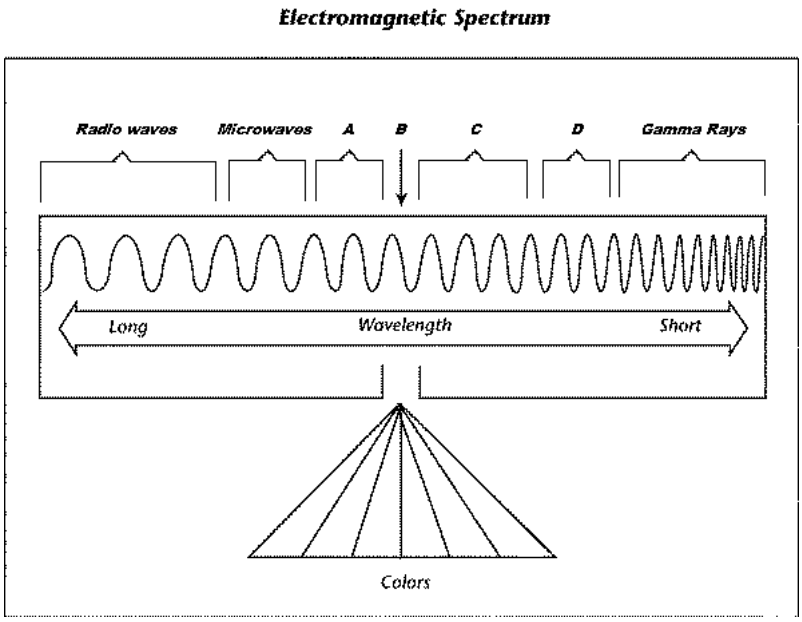
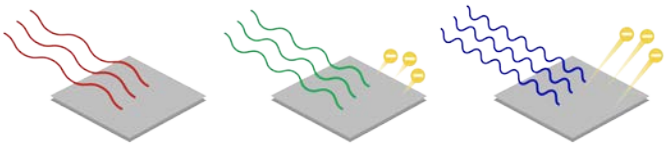
Part 1 - EMS



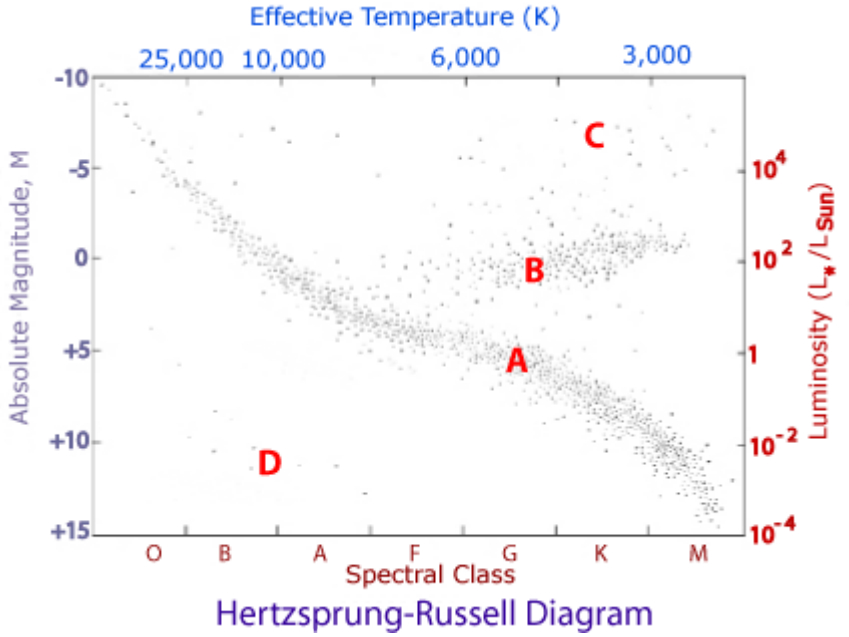
1. Name the type of wave that has the highest frequency.
2. Name the type of wave labeled C.
3. Name the type of wave that has the greatest energy.
4. Which letter shows the type of wave that can be seen by the human eye?
5. Name the type of wave labeled A.
6. Which letter indicates X-rays?
7. Compared to wavelengths of visible light, the wavelength of UV light is (longer/shorter/the same).
8. What is the relationship between frequency and wavelength? Wavelength and energy? Energy and frequency?

Part 2 – Photoelectric Effect (Particle Behavior of Light)



1. What does the model about tell us in terms of frequency, energy, photons, and electrons?
2. Compare what is happening between the red and blue waves.
3. The photoelectric effect is proof that light act like what?
4. Photons are extremely important in the photoelectric effect. What is a photon? Why are they important?
5. We studied photons when we talked about the layers of stars. What can you tell me about the layer(s) of stars in terms of photons?
6. Are all photons able to eject electrons? Explain your answer.
7. Do all substances eject electron or just metals? Explain your answer.

Part 3 – HR Diagram



1. What happens to the stars' size as you move from left to right the HR diagram?
2. What happens to the stars' temperature as you go from left to right on the HR diagram?
3. Temperature tells us the color of the stars. What color would the really hot stars be? What color would the cold stars be?
4. What could you tell me about the stars in region C? Region A? or Region D? (Hint: size, color, temperature, brightness)
5. Which group of stars is considered to have lower than average luminosity as well as higher than average temperature?
6. Which group of stars are near the end of their lifecycle, very large, but very cold?
7. What is the luminosity of The Sun?
8. What is the difference between apparent magnitude and absolute magnitude? What does this mean in terms of The Sun?

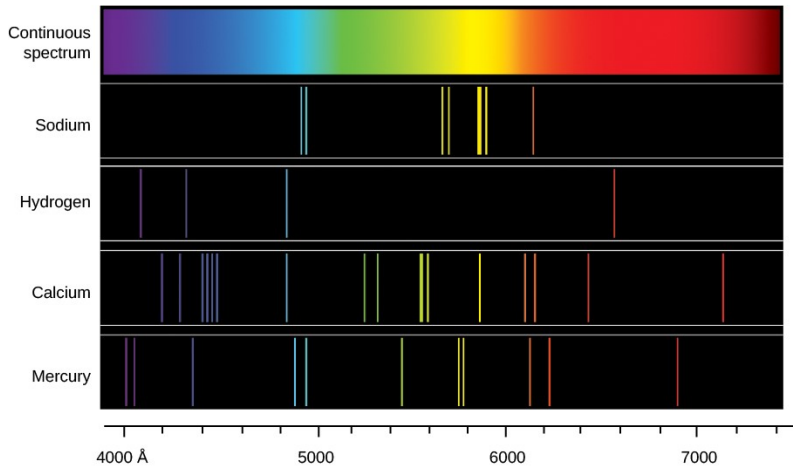
Part 4 – Wave Behavior of Light

1. What two pieces of evidence do we have that tells us that light travels as waves?
2. Destructive interference occurs when the crest of one wave lines up with the _____ of another wave. This results in wave cancellation.
3. In constructive interference, the two waves are _____ to create a greater amplitude.
4. What is light diffraction?
5. Draw a wave. Label the crest, trough, wavelength.
6. Make another way with a shorter wavelength. List what is directly proportional. List what is inversely proportional.
7. Make another way with a longer wavelength that the 1st. List what is directly proportional. List what is inversely proportional.

Part 5 – Stars and Big Bang

1. Why do the position of stars in the universe change?
2. What evidence do we have that shows us this change?
3. What stage of life is The Sun in? What is the percentage of H and He in The Sun? Will The Sun go Supernova, why or why not?
4. The color a star is determined by what?
5. The universe was formed _____ billion years ago. The Sun was born _____ billion years ago.
6. Tell me what you know about The Sun? (Age, Size, Lifecycle, Color, Temperature, Brightness, etc.)
7. Is The Sun the brightest star in the sky? How do you know?

Part 6 - Light Spectra



This is a bright line spectra. It shows us the difference between the continuous spectrum versus the bright line spectra of individual elements.

1. Explain why each element gives off different spectral lines. (Hint: excited electrons, ground state electrons, etc.)
2. Why would sodium give off the same color spectral lines each and every time it is heated?
3. When a salt or metal is heated in a flame, the flame has a distinctive color. This information was eventually extended to the study of stars. What can the color spectra of stars tell us?
4. Draw a model that explains how an atom gives of light/color. Be as detailed as you can. Include electrons, ground state, excited state, absorbed energy, released energy, and a bright line spectra.