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# Introductory Reflections for CHEM 507

1. What is spectroscopy? Try to give the best definition you can based on knowledge that you already have.
   ***Spectroscopy is the study of the spectrum of light This is a basic definition, but can be broadened. See answers to questions below for further information.***

2. What do you already know about spectroscopy and how it's used in chemistry and other fields (such as astronomy, medicine, etc.)?
   - ***Light is either in the form of a wave or a particle***
   - ***Light has energy associated with it***
   - ***Light in the form of a particle is called a photon***
   - ***Photons are emitted when an electron relaxes to a lower energy level from an excited energy level***
   - ***Light in the form of a wave has a specific frequency and wavelength.***
   - ***The energy of a wave determines its frequency. The frequency of a wave determines its wavelength. ($E = h\nu$ & $c = \lambda\nu$)***
   - ***Light can exist in many different wavelengths and many different frequencies. This continuum is called the electromagnetic spectrum.***
   - ***Humans can only see part of the electromagnetic spectrum-from approximately 350 nanometers to 700 nanometers. This is called the visible spectrum.***
   - ***Other parts of the electromagnetic spectrum come from different forms of energy (UV, X-rays, gamma rays, etc.)***

   - ***Electrons can be either excited to a higher energy level(s), or can relax to a lower energy level. To excite an electron, you must add energy to the "system". When an electron relaxes, it releases energy in the form of electromagnetic radiation.***
   - ***The Rhydberg Equation gives the energy value of an electron that moves within an energy level or several levels. This equation is merely an approximation and works well mostly for the hydrogen atom. Larger, more complicated atoms uses the Rhydberg Equation as simply an approximation.***

   - ***Infrared Radiation Detectors can be used to determine where compounds are absorbing IR. Each molecule has stretching and bending associated with the molecules. These fingerprint absorption areas can be used to identify an element or a particular aspect about an element.***

3. What elements (if any) of spectroscopy do you *currently* use in teaching?
   ***Currently, I teach the basics of spectroscopy. Students are introduced to light as a wave and a particle. Waves are diagramed and definitions such as frequency,***

***wavelength, amplitude are explored. The electromagnetic spectrum is introduced and relationships between Energy, wavelength, and frequency are given. Diagrams are drawn by students to demonstrate knowledge of excitation/relaxation and absorption and emission. Students solve problems to understand quantitatively and qualitatively what the formulas mean. Students learn about absorption and emissions spectra. Applications to astronomy, cooking, campfires, neon signs, laser pointers, and army technology are all used.***

4. What instruments are available at your school (Spec 20 or similar, Vernier, Ocean Optics, etc.)? Do you (or anyone) currently use them? If so, what do you do? If not, why not?
   ***The only instrument I currently use in class is a hand held spectrometer. The light given off by an element is diffracted and then read with the spectrometer. I complete a lab in which the student views the spectral lines for particular elements after burning them in a flame. Students draw the spectral lines they see and try to determine the identity of an unknown chemical.***

5. What are your goals or objectives for this course?
   ***I hope to gain a better understanding of what spectroscopy is and how to relate it to students lives. I hope to establish a better lab to use with students so they can see how elements/compounds give off light when excited and after relaxation.***