Do you (not) see what I (don't) see?

At the beginning of this course of study, I was unsure what to expect. I thought I had a decent understanding of sound, having studied anatomy and physiology in pursuit of my BS in Nursing. In understanding the biology of the ear, we learn how sound is detected, which I thought comprised most of what there was to know. I couldn't have been more wrong.

Before this course, when I thought about "science", biology and chemistry came to mind, because those are what I'd previously needed to study. Physics as a concept wasn't something I even could have explained before. I was vaguely aware of its existence, I was a fan of The Big Bang Theory (the TV show, not the physical theory describing how the universe expanded) so of course I thought it had to do with planets mostly. The farthest thing from my mind was that physics explained how music changed moods, how massage therapy treated physical trauma, or how peaceful sounds made plants grow more abundantly. I used to feel like I had a good idea about the world around me, but now I know there's so much more out there.

Sir William Herschel, who is most well-known for discovering the 7th planet in our solar system, the first discovered completely by a telescope, discovered the phenomenon we now refer to as "infrared energy" in early 1800. He discovered it by accident, as the story goes. He published his findings in April of that year. A year later, a man named Johann Ritter decided to take a look at the other end of the visible light spectrum to see if anything was happening beyond violet. There was, as those of us who spend any time in the sun know.

It took a while though for any more discoveries to be made about these energies we can't see. 1867 is when a man named James Maxwell speculated that if infrared and ultraviolet existed, that other frequencies must also exist. Since both infrared and ultraviolet are produced by the sun, that's where many early physicists focused. Twenty years later, Heinrich Hertz, for whom the scale we use to measure frequency is named, produced radio waves in his laboratory.

The discovery of X-rays followed in 1895. Gamma rays in 1900. It wasn't until years later that these were also confirmed to be other forms of light. All these types of energy are part of what's called the electromagnetic spectrum. All these types of energy move at the speed of light, and all are produced by the sun. The sun though isn't the only source of these forms of energy. Every object on Earth produces electromagnetic energy. Our bodies even do. With an average internal temperature of just under 100 Fahrenheit, surfaces are between 90 and 95 F. At that temperature range, we emit infrared radiation (from our bodies!) in a spectrum roughly from 2.5 microns in wavelength to around 30 microns. A micron is how old school physicists measured wavelengths. A micron is one-millionth of a meter. A human hair is 60-70 microns thick, just for comparison. The warmer the surface is, the broader the spectrum of wavelengths over which is radiates is. That's why the sun produces so many different types of energy, its surface is around 10,340 degrees F.

Michael Faraday theorized that light, in whichever wavelength, was merely high frequency electromagnetic vibration. Light is what's called a "transverse wave", which means that its vibration is perpendicular to the direction the wave travels. The vibration is caused by the alternating electromagnetic fields that the waves are made from. Like if you've ever shaken your garden hose to try and get kinks out. You jerk your arm (hence the rope) up, causing a wave in it, and the wave moves along the length of the hose. That's how vibration is created in light energy.

Just like sound energy, light energy can be used to heal. Ancient people used to use sunlight to treat many illnesses, many of them related to the skin, Eczema, psoriasis and mood disorders like depression. The sun was even believed to help wounds heal and relieve pain. Just as with many other concepts, the ancients had it right. Today light therapy is used to treat some of the same conditions. Different colors of light (which simply means different wavelengths of energy) are used for different conditions. This is because each wavelength reacts differently with human tissue,

Ultraviolet light, in its various forms, is used often for dermatological issues. UV light is from 0.1-0.4 microns in wavelength and is broken down into three categories: UV-A (0.32-0,4 microns) UV-B (0.29-0.32 microns) and UV-C (0.1-0.29 microns). UV-A will penetrate deeper, usually through the dermis, while UV-B only penetrates the epidermis. Both of these are what cause us to tan, and the types of light that can cause skin cancer. UV-C is that blue glow we see in sterilization equipment, because it has very strong germicidal properties. It can kill bacteria on human skin with virtually n-harm to the skin itself.

Blue light, which is 0.44-0.5 microns, is used to treat acne and neonatal jaundice. These are the kinds of light we see in neonatal units, commonly called "bilirubin lights. They're called that because that wavelength spectrum of light causes bilirubin in the skin to be broken down. Green light, 0.5-0.57 microns, is used to treat skin conditions related to pigmentation. Yellow, 0.57-0.59 microns, stimulates collagen production. Red light, 0.62-0.75 microns, penetrates more deeply, beyond subcutaneous tissue, and is used for pain relief and wound healing.

Something about which we must be mindful though is the "other side of the coin", as they saying goes. Vibration of all types can heal, but can it also harm? Everything around us emits energy. We are constantly, continuously bombarded by energy we can neither see nor feel. What are the effects of that? We've learned in this course how energy we can't see but can hear, or in some cases not hear, can affect our bodies, the organic objects around us in a positive way. I think part of understanding healing is to understand what is not healthy as well. Some skin tones are more sensitive to ultraviolet light. Pale skinned people, for example. What other attributes of our physical bodies make us more or less susceptible to the impact of the other energies to which we are exposed? We already know that too much exposure to x-rays is unhealthy, for example. What about all the other frequencies?

While I feel like I have learned so much in this course, it has equally served to demonstrate to me that there is so much more out there to discover. I'm hungry for that knowledge and understanding, so thank you for this course for awakening that in me.