Why is the sky blue

It is easy to see that the Sky is Blue. That is simply because of the different Light Spectrums we see that are spread out, which makes Blue the only available light we see, and heres why! Theres alot of explainations when it comes to understanding why the sky is Blue. To understand why the Sky is Blue, you must first understand the basics. Such as the different Electromagnetic Waves, Colors of the Rainbow, Rayleigh Scattering, and the Different Light Spectrums. Color is simply defined as the sensation produced by the effect of light waves striking the retina of the eye.

The color of something depends mainly on which wavelengths of light it emits, refects, or transmits. Color is also determined by which frequency or which colors of the rainbow are present. And we see what comes back to us as an combination of spectrums or colors and Sometimes a single color. But it depends on what frequency is reflected back. While light comes from the sun and reflects on any object we see. There are seven different Types of Electromagnetic Spectrum wavelengths, Such As Radiowaves, Microwaves, Infred, Visible Light, Ultraviolent, X-Ray, and Gamma Rays.

These wavelengths show what can be described as how we see just the color Blue instead of all colors of the rainbow. Radiowaves have the longest wavelengths in the electromagnetic spectrum. Radio waves also carry signals to Electronics such as your Television and Cell phone. Light isnt the only type of electromagnetic wave we see. There are other electromagnetic waves that are present and that we use everyday. For example, when you use the microwave to heat up leftovers for dinner, your using microwaves. Another example would be when your listening to the radio stations, radio waves come from those broadcasters.

Accelerating charges can create an electromagnetic waves. So by moving charges back and forth, thisx will produce electric and magnetic fields that can travel at the speed of light. So when Electromagnetic waves spread out or as scientists say " Propagate" from their source, at the speed of light then the source has created oscllating electric and magnetic fields, perpendicular to each other that move away from the source. There is no medium for a electromagnetic wave to travel through. For example, sound waves cant travel though vaccums. But electomagnetic waves can do so. They carry energy, which is proportional to the frequency of the wave.

Also electromagnetic waves have momentum and can exert pressure. Based on the frequency of an electromagnetic wave, they can be split into different categories. Magnetic Fields can be produced by moving charges (currents). This can happen only when moving charges or currents are steady going. Magnetic Fields have an North and South pole. The magnetic field and electric field can be defined in the Lorentz force law. Tesla is the SI unit for magnetic fields, which is used in the magnetic part of the Lorentz force law. The formula is F = qE + qv x B were E stands for Electric Force and B stands for Magnetic forces.

Microwaves have wavelengths that can be measured to things as small as centimeters. There are wavelengths that are close to an Foot in length, which we heat our food in the Microwave. Microwave wavelengths are know to penetrate haze, light rain, snow, clouds, and smoke. Because Microwaves can penetrate haze, light rain, snow, clouds, and smoke, they are Good waves to use in order to view the earth. An example would be an star because they give off microwaves believe it or not. Another example would

be when using a cell phone they give off microwaves. Infred light Is between the Visible light and microwave electromagnetic spectrums.

Infred has various types of wavelengths. The heat We experience Everyday are Infred waves that are thermal. There are shorter wavelengths that are used by your TV's remote control. Another example of infred light are stars, reason being hot stars give off heat therefore making it an example of how infred light gives of warmth. The Only Electromagnetic Waves we see are visble light waves. The Color that has the longest Lightwave is the color Red. And Violet has the shortest wavelength. We see these Colors as the Rainbow, But each color has a Different wavelength.

When all color wavelengths are blended together, they make white light. For example, If you take a prism, and shine white light throught it, the light is Broken up into all colors of Visible light spectrums which We also call the Rainbow. Ultraviolet has an shorter wavelength than visible light. They may be invisible to the human eye. But insects such as Bumblebees, can see ultraviolent light. Our sun emits light of different wavelengths that Give what are known as " Sunburns", caused by Ultraviolent waves. UV light has shorter wavelength than visible light. They has been divided by scientists into three different regions.

Such as, the near ultraviolet, the far ultraviolent, and the extreme ultraviolet. Which are distinguished by how energetic the ultraviolent radiation is, and by the wavelength of the UV light, relating to energy. X-Rays have a Higher energy than ultraviolent waves, But have smaller wavelengths. X-rays are like particles rather than waves. An Example of an X-ray could be at the doctors office when getting an Cat scan for your brain. Gamma-rays have the

smallest wavelengths and the most energy of any other wave in the electromagnetic spectrum. X-Ray waves are Generated radioactive atoms and nuclear explosions.

Living cells can be killed by Gamma-rays. They are also Given off by stars, and by radioactive substances. Gamma-rays are very difficult to stop, furthermore they can pass through most materials. In Addition you must know the concept of Rayleigh Scattering, which light will be scattered off objects whos size is lower than the wavelength of that light. In fact scattering is thee proportional inverse of the 4th power of the wavelength. But Lord Rayleigh explained it mathematically. For example, blue light of the 450 wavelength is scattered 4. 4 times more than the 650nm red light.

Furthermore, the higher the frequency of the wave the more scattering it will encounter. Why is the sky blue is a nontrivial question because blue light is scattered more strongly than the red light. Likewise, as the sun shines through the atmosphere the blue is scattered towards us, leaving red light unscattered in the sky itself which consists of particles far apart. Clouds close together contain Particles that are range of the area that continues the scattering. Which also depends apon the wavelength of the light, so the blue light has a shorter wavelength that the molecules are spread over a small area.

Redlight has a longer wavelength, the molecules are spread over a big area. When the 2 cancel there are more than blue that scatters more than the red plus the other colors. When all the colors of the rainbow are mixed they make the sun look white. Light seperates in all the colors when white light is shine through a prism. In 1859 John Tyndall took the first steps of correctly

explaining why the sky is blue. Tyndall discovered that when color passes through a clear fluid holding small particles in suspension, so that the shorter wavelengths of blue light thats scattered, more than the red.

For Instance, by shining a beam of white light through a tank of water with a little soap or milk mixed in it. Which shows that from the side, the beam can be seen by the blue light that is scattered, and is seen directly from the end which is red after passing through the tank. This is most commonly known as the Tyndall effect. This demonstration is an example also as Rayleigh Scattering which was named after Lord Rayleigh who studied in more details later. The two scientists Tynball and Rayleigh both came to the thought that the sky is blue , reason being its caused by small particles of dust and droplets of water vapor in the Air.

Everyday people say the wrong explaination as to why this is the Case. Scientists then realized that if that was true, then there would be more variation of why then sky is blue and the humidity or haze conditions that were observed. So they made a suggestion that the molecules of oxygen and nitrogen in the air will respond to the account for the scattering. Then the conclusion was brought in 1911 by Einstein, which calculated the formula for the scattering of light that comes from the molecules and it was found that this supported the experiment. Einstein was able to use a calculation as an further verification.

Because Electromagnetic fields of the light waves are lead by persuation that electronic diple moments in the molecules, they can scatter light . So energy can be absobed when light beams interact with particles suspended in air. So when energy all is scattered theresirection of a light path. A function of the

size of the particles relating to wavelengths of falling particles is the amount of light that is being scattered. So therefore particles that are very small can compare to wavelengths of the light scattered selectively according to the wavelength.

When all the colors are scattered by air moleclules, the colors blue and violent are the most scattered colors. And we see the sky as Blue instead of violent because our eyes are more sensitive to blue light. So at sunrise and sunset, sunlight passes through the atmosphere in the day rather than when the is higher in the sky. To scatter the violet and blue light, there are more atmosphere and more molecules. If theres a big enough space, then the red and blue light is not visible to your sight. Likewise, yellow, orange and red is in a undeviated path between the sun and your eyes.

After all this is why the sunset always looks like its yellow, orange, and different shades of red. So when we look up in the sky the red cones pick up the small amount of scattered red light, but is less stronger than orange and yellow wavelengths. And the more strongly scattered green and green-blue wavelengths responds to the green and yellow cones. If violet and indigo didnt exist in the spectrum, the sky would appear blue with a little green tinge. As an conclusion, the sun is blue because blue and violet light is scattered by gas molecules alot more than the other wavelengths of light.

So violet isnt seen because our eyes detect blue light much more efficently. And the three Scientist that helped to come to the conclusion were Einstein. , John Tydall who came up with the Tyndall effect, which discovered that when color passes through a clear fluid holding small particles in a suspension, the shorter wavelengths of blue are scattered much strongly than the red. And

lastly Issac Newton, who demonstrated that the white light from the sun is a mixture of colors of the rainbow. This is the true explaination as to why the Sky is blue!