It unique ability of being able to travel

It is sometimes very difficult to fathom the real form of light and how it travels. One can not understand fundamental concepts about light if in first place they don’t understand what light is.

Light can simply be defined as visible electromagnetic radiations which enables the human eye to see (Burnie 9). The electromagnetic radiations are a combination of electric and magnetic fields. The electromagnetic radiations are composed of waves and particles (Burnie 19). The visible light has got a wavelength of between 400 to 750 nanometers with its frequency ranging from 400 to 800THz. Light contains ultraviolet and infrared radiations as adjacent radiations (Burnie 21). Different radiations travel at different speeds according to their composition and properties. The estimated speed of light is 300, 000, 000 m/s when it travels in a vacuum. This paper will discuss the path of light and the various properties of light.

The fundamental difference between light waves and other types of waves is in the ability of light waves to travel in a vacuum (Stille 18). This unique ability of being able to travel in vacuum is what makes it travel in a straight line. The movement of a light wave is often facilitated by the electric and magnetic fields which are a source of energy. It is common knowledge that light travels in a straight line. The light waves travel fast in low resistance paths which are normally straight lines. Travelling in straight lines takes the least time and that is what is preferred by light waves (Stille 9).

The speed of light is very high because light waves prefer the shortest distance. The surface of travel is always curved due the wavelike nature of light. Light waves travel in straight lines whether in a vacuum or a

transparent medium. The concept of interference and diffraction come into play when the light waves encounter obstacles. The pinhole experiment is normally used to verify this fact.

Light normally spreads out in waves when it passes through a hole with almost the same size as that of the light wavelength. In the case of two holes, the light waves will tend to interfere with each other thus affecting movement (Goldstein 32). The overlapping of two light waves is what causes interference. The interference can be constructive or destructive depending on the number of holes. Constructive interference occurs when two overlapping peaks of the two waves combine to form one wave.

Light waves can disappear when they pass through two holes by the destructive interference process (Goldstein 45). Small holes and boundaries cause the light waves to move in different directions. The spreading out of light waves is what is known as diffraction. The speed of light depends entirely on the medium it passes through and most importantly its power. Thick and dark materials are known to slow the speed of light. The other cause of light diffraction is the presence of rough and irregular surfaces in its path (Goldstein 105).

Light maintains its straight path unless acted upon by external forces. Light waves have all the fundamental qualities of waves including direction, and amplitude. Light always moves in one direction incase there is no obstacle in the path.

Many scientists have come up with different theories that try to dispute the fact that light travels in a straight line. Some scientists argue that the

shortest distance proffered by light does not have to be necessarily a straight line (Waldman 30). Reflection is a process by which the light rays are bounced off by a smooth surface.

The reflection is majorly caused by the inability of the surface to absorb the light energy present in the rays. The mirror is a perfect example of a smooth surface that reflects light (Stille 17). Light rays are always reflected by any opaque surface in the way. The angle of reflection is always equal to the incident angle on the surface where the reflection process takes place. The law of reflection applies to all types of electromagnetic waves including light (Burnie 12). Scientific research has shown that all surfaces have the potential of reflecting light but many of the reflections are minimal.

Shiny metal and mirrors form a good example of surfaces that reflect the light waves (Burnie 34). The direction of light normally changes depending on the medium the light waves are passing through. The law of reflection applies on both flat and curved surfaces. The reflection of light on plane mirrors forms virtual images.

For plane mirrors, the observer sees the virtual image location as the source of light which is not the case (Waldman 28). Curved mirrors produce real images because the source of light is normally the image location. The reflected light rays from the mirror surface always converge at the image location point (Stille 13). The reflected rays are very important in enabling the eye to view object images. The divergence of light rays helps the observer to clearly view the image of the object in question. When the direction of light changes when the light waves enter a different medium.

The alteration in the velocity of light is normally caused when the light waves move from one medium to another. Different materials have got different refractive indices hence causing a variance in the velocity of light in different media. The direction of light waves changes only when refraction and reflection occurs (Singh 45). Despite the change in velocity of the light waves, their frequency does not alter in any way. The change in wavelength by the light waves is what alters the speed of light speed. Water and air have different refractive indices which makes them perfect for demonstrating the concept of refraction (Sign 32).

The water and straw experiment clearly illustrates how light waves change their direction and speed because of a medium change. A straw in a glass of water gives the observer two false impressions. The straw will appear as if it is bent with a shallow depth. The medium change causes a fluctuation in the speed of light waves which result in refraction of the light rays at the boundary of the two media (Sing 102). When light rays enter a different medium, they tend to bend making the straw in the water to also appear bent from the observer’s point of view. Rainbows are caused by the concept of refraction (Goldstein 87).

This is normally demonstrated by the formation of a rainbow-spectrum when light is passed through a prism made of glass. Dispersion of light occurs when light rays pass through a medium with a varying refractive index. The dispersion of light waves makes it appear in different color components. The different color components are caused by the varying frequencies by light waves (Burnie 16). The fluctuation in the refractive indices of different media is by different factors one of them being temperature. When this occurs,

strange optical images are normally observed like mirages. When a light wave strikes the surface of an object, it faces three options. The wave can be reflected, transmitted or absorbed.

In the case of absorption, the light waves are normally converted to thermal energy or heat as it is commonly referred to (Stille 105). Every object is composed of either atoms or molecules which tend to vibrate in the presence of energy. The vibration of electrons or molecules is only possible when their frequency and that of the light waves is the same. Absorption of light is made possible by the conversion of the vibration energy into heat (Stille 123). In conclusion, light travels in a straight path unless a change of medium occurs. Light waves are capable of travelling through a vacuum a property that makes them unique.

Diffraction and interference of light waves occurs when light is passed through a pinhole. Reflection of light occurs when light waves come into contact with a smooth surface. Refraction occurs when the velocity of light is altered in different media. Absorption takes place of light the vibrating medium electrons convert the vibration energy into heat.

Works Cited

Burnie, David. Light. New Delhi: Dorlin Kindersley, 1992.

Print. Goldstein, Rebecca. Properties of Light. New York: Houghton Mifflin Harcourt, 2001. Print Singh, Sardar. Longman Science Physics 10.

New Delhi: Pearson Education India, 2009. Print Stille, Darlene. Manipulating Light: Reflection, Refraction and Absorption. Minneapolis: Compass Point

Books, 2005. Print. Waldman, Gary. Introduction to Light: The Physics of Light, Vision and color.

New York: Courier Dover Publications, 2001. Print.