

Explaining the Rainbow through Physics

Introduction

Several explanations have been put forward concerning the features and phenomena of the world. For instance, several myths and concepts have been used in the bid to explain the formation of the rainbow. In order to establish how and why the rainbow forms, analysts as well as physicists dug the toes deep into the issue and provided valid information. To date, research is still done to foster the understanding of people concerning the issue at stake. Similarly, several books have written about the rainbow with an aim of putting the readers right. This paper examines the concept behind the rainbow by explaining how a rainbow is formed. In addition, the paper describes the physics behind the rainbow as well as the explaining why we see the colors that we do of the rainbow.

How a Rainbow is Formed

The rainbow usually appears after rains when the sun shines in the presence of raindrops. Beams of light are made up of several colors that often split under some conditions. For instance, when light rays collide with raindrops in the atmosphere, they break up into different colors. Since the raindrops are randomly placed, the angles at which they are hit by the light rays vary. As a result, different colors emerge from the raindrops forming a rainbow. Though a raindrop splits a beam of light into many colors, only a single color leaves the drop. Therefore, it is evident that each drop gives forth a given type of color. Hence, the rainbow only forms if there are several raindrops in the atmosphere. On that note, each raindrop is produces a given color of the rainbow and relies on the position of the rain droplets in the air.

In essence, the rainbow assumes the shape of the raindrops but the horizon covers the lower half. Hence, the rainbow is seen as an arc. Similarly, the raindrops possess different speeds and fall at varied distances. As a result, the colors emerge in a circular form. For instance, the arrangement of colors of the rainbow does not change since the rate at which

light is reflected and bends is constant. For that case, whenever light rays of that color enter a raindrop, the color that exits locates the same position on the rainbow. Therefore, whenever sunlight emerges in the presence of raindrops, a rainbow has to form since the position and speed of the rain droplets vary. Hence, the angles at which light rays strike the drops also differ leading to the formation of a rainbow.

The Physics behind the Rainbow

A rainbow is not a natural phenomenon and can be explained in several ways. For instance, physicists explained the concept behind the formation of the rainbow. It is evident that a rainbow is formed when light collides with raindrops. Therefore, the concept behind the rainbow lies in the reflection and refraction of light. When a beams of light move from one medium to another, its speed as well as direction is altered. Similarly, refraction of light occurs whenever light penetrates the surface of the water. As a result, the rays bend at varied angles producing different colors. On the same note, the bending effect and angle the angle produced during refraction depends on the wavelength of the light.

For instance, when sunlight bombards with raindrops, the white rays are split into many colors whose direction is different from that of the original rays. The colors are further reflected and enlarged by the surface of the raindrop back into the atmosphere. The act of refracting the beam of light brings about the prism effect. On the same note, reflection is achieved by the raindrop, bringing back the colors formed in the air. Additionally, the colors are formed with respect to the wavelength of the light that strikes the raindrop. Furthermore, the direction that the refracted light assumes depends on the angle at which the normal rays meet the drop.

Due to the reflection and magnification of the colors back to the atmosphere, a rainbow is formed. On the same note, the arrangement of the colors of the rainbow is determined by the wavelength of the normal. It is also noted that, during refraction and

reflection of light within the raindrop, some light strays off at varied angles resulting to the formation of a double rainbow. Red light beams have a shorter wavelength and, hence, they are reflected at larger angle forming the top band of the rainbow while violet light rays have a long wavelength. As a result, they are refracted and reflected at smaller angles, forming the inner band of the rainbow.

Why We See the Colors We Do

Although rain droplets break beams of light into many colors, we see only seven colors of the rainbow. For instance, each drop of water in the atmosphere has a role to play in the formation of the rainbow. It is noted that the color that leaves a raindrop is determined by the speed and position at which the light gets the drop. Moreover, all rain droplets have the capability and form all the colors of the spectrum at different times but only one of the colors formed can be seen. Hence, we see only seven colors of the rainbow. In addition, the rainbow is formed by the first ray that strikes a raindrop. Thus, the successive beams of light hitting the same rain droplets produce the other colors of the rainbow.

Similarly, the millions of raindrops in the air maintain the rainbow since they form the colors of the spectrum at different times due to the change in the angle. Furthermore, the wavelength of the light rays is specific, thus, producing similar colors from different raindrops. Additionally, the angles at which the colors are produced are constant leading to the formation of specific colors that we see of the rainbow. On the same note, we cannot see the complete circle of the rainbow due to the shape of the horizon. Equally, the fact that only one color is seen at a time when sunlight hits a raindrop, it requires a lot of raindrops to enable us see the colors we do.

Conclusion

The rainbow only forms after a rainstorm when sunlight meets the rain droplets. For instance, a droplet of water breaks white light into several colors. In addition, the angle

formed between the light ray and the raindrop influences the type of color produced. Moreover, it requires many rain droplets for all the colors of the rainbow to form. On the same note, it is noted that the arc shape of the rainbow forms is due to the shape of the universe. As a result, the rainbow is semi-circular in shape. On the other hand, physicists explain that a rainbow appear due to the ability of light rays to bend and change the speed as they move from one medium to another. Furthermore, physics provides that, the location of the colors of the rainbow depend on the wavelength of the light rays. On the same note, we see the colors we do due to the ability of the raindrops to reflect a variety of colors. The fact that, the speed and location of a raindrop determines the type of color formed enables people see the rainbow until either sunlight or raindrops disappears.