

The northern lights: aurora borealis essay



**ASSIGN
BUSTER**

You are outside on a clear summer's night, when all of a sudden a flash catches your eye. You whirl around in bewilderment as the black night sky flashes and dances with a whirling array of colors. The northern horizon is draped with an iridescent green, deep blues, sharp violets, scarlet reds, and bright oranges and yellows. You stand awestruck as the colors descend, like a melting rainbow, across the sky. Then, as quickly as they appeared, they vanish without a trace. On clear nights, when the atmosphere is right, an amazing light show dances across the night sky. This natural phenomenon is known as aurora borealis, or the northern lights. This incredible spectacle has been a source of myth and fable for thousands of years, and the explanation behind these beautiful illuminations is as amazing as the lights themselves. Some areas of the earth can view the aurora more often and more brilliantly than others and the spellbinding celestial lights are unlike anything else in this world.

Since the beginning of time, ancient civilizations have taken notice of the northern lights, and each had a unique explanation of them. Some believed they were caused as a result of fungi on rotting wood, others believed they were magic, while many believed they were in the presence of temperamental gods and summoning spirits. In China, ancient people believed they were seeing dragons, with brightly colored scales moving silently in the night. Others in the Mediterranean region believed that the red light in the night was blood flung onto the sky. The Vikings believed the aurora was the beautiful maidens called Valkyries, which escorted those killed in battle to the gods. The Sami people of Lapland believed they had power over the lights, and whistling under them would cause them to come

closer. Many ancient peoples would not stare at or speak of the aurora, due to a fear of insulting their divine nature. The Finnish called them revontulet, which means fox fires, for the reason that an arctic fox whipping its tail was responsible for throwing snow high into the air, lighting up the sky. Others believed they were torches held by spirits to lead the way to the after life. However enchanting and intriguing these explanations were, we didn't actually begin to find the real rationalization for the northern lights until 1774, when Jean Jacque Dortous de Mairan of France linked the auroras to solar activity.

The sun is the actual source of the northern lights. The sun gives off high energy charged particles, electrons and protons, which are also known as ions. This cloud of particles is plasma, and travels at speeds of 300 to 1200 kilometers per second. This plasma is also called solar wind, and travels the distance from the sun to the earth in the span of about three days. The solar wind, because the earth's magnetic field prevents it from penetrating our atmosphere, streams around our planet, encasing earth and its magnetic field within a cavity called the magnetosphere. The magnetosphere then acts as a giant generator that can produce ten million megawatts of electrical power. The ionosphere is located at the bottom of the charged area at about 60 to 600 kilometers above the earth's surface. The electrical current created is discharged in the ionosphere in a magnetic storm. As the charged particles collide with the gasses in the ionosphere, it produces an illuminating glow that is the northern lights. The color of the light produced is caused by the type of gas the particles collide with. Nitrogen molecules colliding with the ions create blue and violet light, oxygen produces yellow-

green colored light, which is the most commonly seen light, and red light is produced at low altitudes by neutral nitrogen. So, when the aurora is seen, it testifies that the ionosphere and our protective atmosphere are being energized by the electric power generated in the magnetosphere.

The aurora varies in intensity and effects different areas of the world more so than others. The sun has a fluxuation of energy production about every 11 years, and these times are when solar wind is produced the most, causing the aurora effect. Sun spots, or dark areas on the sun, are visual indications of solar wind gusts. So the more sunspots we see on the sun, the more auroras we experience on earth. 2 to 5 days after observing a sunspot, scientists expect solar wind to reach earth, causing the colored lights.

Auroras occur mostly in the Arctic and Antarctic regions of the earth. In the south, auroras are referred to as aurora australis, or southern lights. They occur along ring-shaped regions around the north and south geomagnetic poles. The northern auroral ring, which constitutes the viewing area for the northern lights, extends over northern Finland and Scandinavia, all of Canada and the northern United States, Alaska and Siberia. If there is a large amount of solar wind, the oval can reach as far south as the skies over central Europe. Auroras change in intensity from night to night, but the best viewing hours are from late night through early morning, although auroras may happen anytime during the day. Early spring and late autumn are the best times to observe the northern lights.

The northern lights are the spectacle of a lifetime. They glow and spin across the sky, mystically enchanting our imaginations. For ages they have been a source of story and myth. They are formed by cosmic plasma from the sun,
<https://assignbuster.com/the-northern-lights-aurora-borealis-essay/>

known as solar wind, and collide with our atmosphere in an explosion of color. They are seen on earth in distinct patterns, called auroral rings, and can be viewed in accuracy on clear nights when the solar wind is energizing our atmosphere and discharging into the ionosphere. The auroras are a natural phenomenon that is unlike anything in on this earth. They are bizarre colors that illuminate and dance to life in the night sky, they are caused by the suns particles, they appear and vanish in the night, they are the northern lights.