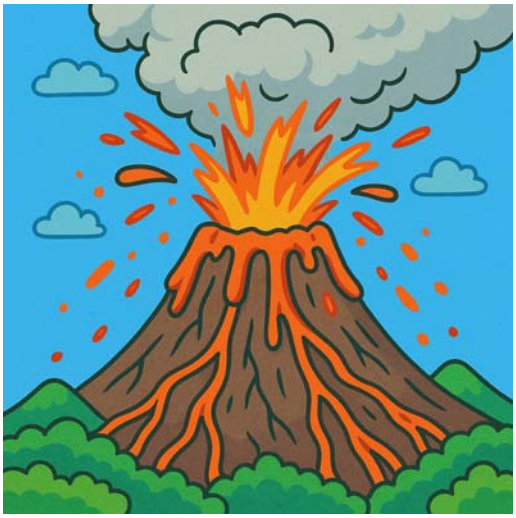
Name _____

How Volcanoes and Natural Processes Affect the Ozone Layer



The ozone layer is a thin part of Earth's atmosphere that protects life by blocking most of the sun's harmful ultraviolet (UV) rays. Without this protective layer, people, animals, and plants would be exposed to dangerous radiation. While humans have caused serious damage to the ozone layer in the past—mainly by releasing chemicals like CFCs—natural events like volcanic eruptions can also affect it.

When a volcano erupts, it blasts gases and particles high into the atmosphere. One of these gases is sulfur dioxide. When sulfur dioxide reaches the stratosphere (the same part of the atmosphere where the ozone layer is), it turns into tiny droplets called aerosols. These aerosols can cause chemical reactions that damage ozone molecules.

Although volcanoes do not release CFCs like human-made products once did, the chemicals they do release can make it easier for other gases to destroy ozone. For example, aerosols from volcanic eruptions can provide a surface for chlorine compounds to react, speeding up ozone loss.

One famous example is the eruption of Mount Pinatubo in the Philippines in 1991. This eruption sent a huge cloud of gas into the stratosphere. Scientists noticed that ozone levels dropped more than usual in the years after the eruption. However, this effect was temporary. As the volcanic particles slowly disappeared from the atmosphere, the ozone layer began to recover.

Natural events like solar storms, lightning, and even forest fires can also change the makeup of the atmosphere. Sometimes they add gases that hurt ozone; other times, they may even help it form. Scientists continue to study these natural processes to better understand how they work with or against human activity.

The good news is that the ozone layer is now healing. Thanks to international efforts like the Montreal Protocol, harmful CFCs have been mostly banned. Still, natural processes like volcanoes will always be a part of how Earth's atmosphere changes.

Understanding both human-made and natural causes of ozone damage helps scientists protect the air we breathe and the shield that keeps our planet safe.