

What is Global Warming:

A gradual increase in the average temperature of the Earth's Atmosphere and its oceans, and it has permanently changed the Earth's climate. The layer of gases surrounding the Planet Earth that protects life on Earth by absorbing ultraviolet solar radiation, warming the surface through heat. Reasons of thickening of Atmosphere Increasing level of Carbon Dioxide emissions day by day and deforestation

1. Melting Ice: Temperatures are rising in the planet's Polar Regions, especially in the Arctic. Vast majority of the world's glaciers are melting faster than new snow. Scientists expect the rate of melting to accelerate Oceans Get Warmer When Oceans get warmer it causes stronger storms.
2. Hurricanes Intensity grows as oceans heat up Ten Warmest years 1. 2014 2. 2010 3. 2005 4. 1998 5. 2013 6. 2003 7. 2002 8. 2006 9. 2009 10. 2007 The ten warmest years ever recorded have all occurred since 1998. One of the five deadliest hurricanes. The storm is currently ranked as the third most intense United States land falling tropical cyclone. Damage: 108 Billion \$. Hurricane Sandy deadliest and most destructive hurricane of the 2012 Atlantic hurricane season The second-costliest hurricane in United States history. Fatalities: 233 more or less • Damage: 75 Billion \$
3. Sea level rise: Average global sea level has increased eight inches since 1880 • Global warming is now accelerating the rate of sea level rise • Increasing flooding risks to
4. Changing Seasons: Spring arrives much earlier than it used to be on average in the northern hemisphere. Snow melts earlier. Reservoirs fill too early and water needs to be released for flood control.
5. Plant and animal range shift: A changing climate affects the range of plants and animals, changing their behaviors. The range of some warm weather species will expand, while those that depend on cooler environments will face shrinking habitats and potential extinction. Polar Bear because of ongoing and potential loss of their sea ice habitat resulting from climate change, polar bears were listed as a threatened species in the US under the Endangered Species Act in May 2008 Snow Leopard found in 12 countries including China, Bhutan, Nepal, India,

Pakistan, Afghanistan, Russia, and Mongolia but their population is dropping. Giant Panda is considered a national treasure in China Bamboo, the panda's staple diet, is also part of a delicate ecosystem that is affected by the changes caused by global warming. Reduce Emissions Significantly reduce the amount of heat trapping emissions we are putting into the atmosphere Stop Deforestation Reducing tropical deforestation can significantly lower global warming emissions and Plant Trees Increase use of renewable energy sources • Renewable energy sources such as Solar, Wind, Geothermal, Bio Energy are available around the world. Renewable energy has the technical potential to meet the vast majority of our energy needs. Transportation Improve efficiency in all modes of transport switch to low carbon fuels.

6. **Documentaries to Watch: The Inconvenient Truth • Chasing Ice • Planet Earth • The Age of Stupid • The Great Warming.**

The Ozone Layer: The Earth's atmosphere is divided into several layers. The lowest region, the troposphere, extends from the Earth's surface up to about 10 kilometers (km) in altitude. The next layer, the stratosphere, continues from 10 km to about 50 km. Most atmospheric ozone is concentrated in a layer in the stratosphere, about 15–30 kilometers above the Earth's surface. Ozone is a molecule containing three oxygen atoms. It is blue in color and has

a strong odor. Normal oxygen, which we breathe, has two oxygen atoms and is colorless and odorless. Ozone is much less common than normal oxygen. Out of each 10 million air molecules, about 2 million are normal oxygen, but only 3 are ozone. However, even the small amount of ozone plays a key role in the atmosphere. The ozone layer absorbs a portion of the radiation from the sun, preventing it from reaching the planet's surface. Most importantly, it absorbs the portion of ultraviolet light called UVB. UVB has been linked to many harmful effects, including various types of skin cancer, cataracts, and harm to some crops, certain materials, and some forms of marine life. At any given time, ozone molecules are constantly formed and destroyed in the stratosphere. The total amount, however, remains relatively stable. While ozone concentrations vary naturally with sunspots, the seasons, and latitude, these processes are well understood and predictable. Each natural reduction in ozone levels has been followed by a recovery. Recently, however, convincing scientific evidence has shown that the ozone shield is being depleted well beyond changes due to natural processes.

Ozone

Depletion: For over 50 years, chlorofluorocarbons, or CFCs, were thought of as miracle substances. They are stable, nonflammable, low in toxicity, and inexpensive to produce. Over time, CFCs found uses as refrigerants, solvents, foam blowing agents, and in other smaller applications. Other chlorine-containing compounds include methyl chloroform, a solvent, and carbon tetrachloride, an industrial chemical. Halons, extremely effective fire extinguishing agents, and methyl bromide, an effective produce and soil fumigant, contain bromine. All of these compounds have atmospheric lifetimes long enough to allow them to be transported by winds into the stratosphere. Because they release chlorine or bromine when they break down, they damage the protective ozone layer. In the early 1970s, researchers began to investigate the effects of various chemicals on the ozone layer, particularly CFCs, which contain chlorine. They also examined the potential impacts of other chlorine sources. Chlorine from swimming pools, industrial plants, sea salt, and volcanoes does not reach the stratosphere. Chlorine compounds from these sources readily combine with water and repeated measurements show that they rain out of the troposphere very quickly. In contrast, CFCs are very stable and do not dissolve in rain. Thus, there are no natural processes that remove the CFCs from the lower atmosphere. Over time, winds drive the CFCs into the stratosphere. The CFCs are so stable that only exposure to strong

UV radiation breaks them down. When that happens, the CFC molecule releases atomic chlorine. One chlorine atom can destroy over 100,000 ozone molecules. The net effect is to destroy ozone faster than it is naturally created.

What is the ozone layer and why is it important?

The ozone layer is a concentration of ozone molecules in the stratosphere. About 90% of the planet's ozone is in the ozone layer. The layer of the Earth's atmosphere that surrounds us is called the troposphere. The stratosphere, the next higher layer, extends about 10–50 kilometers above the Earth's surface. Stratospheric ozone is a naturally occurring gas that filters the sun's ultraviolet (UV) radiation. A diminished ozone layer allows more radiation to reach the Earth's surface. For people, overexposure to UV rays can lead to skin cancer, cataracts, and weakened immune systems. Increased UV can also lead to reduced crop yield, disruptions in the marine food chain, and other harmful effects.

How does ozone depletion occur?

It is caused by the release of chlorofluorocarbons (CFCs) and other ozone-depleting substances (ODS), which were used widely as refrigerants, insulating foams, and solvents. The discussion below focuses on CFCs, but is relevant to all ODS. Although CFCs are heavier than air, they are eventually carried into the stratosphere in a process that can take as long as 2 to 5 years. When CFCs reach the stratosphere, the ultraviolet radiation from the sun causes them to break apart and release chlorine atoms, which react with ozone, starting chemical cycles of ozone destruction that deplete the ozone layer. One chlorine atom can break apart more than 100,000 ozone molecules. Other chemicals that damage the ozone layer include methyl bromide (used as a pesticide) and halons (used in fire extinguishers). As methyl bromide and halons are broken apart, they release bromine atoms, which are 40 times more destructive to ozone molecules than chlorine atoms.

How do we know that natural sources are not responsible for ozone depletion?

While it is true that volcanoes and oceans release large amounts of chlorine, the chlorine from these sources is easily dissolved in water and washes out of the atmosphere in rain. In contrast, CFCs are not broken down in the lower atmosphere and do not dissolve in water. The chlorine in

these human-made molecules does reach the stratosphere. Measurements show that the increase in stratospheric chlorine since 1985 matches the amount released from CFCs and other ozone-depleting substances produced and released by human activities.

What is being done about ozone depletion?

In 1978, the use of CFC propellants in spray cans was banned in the U.S. In the 1980s, the Antarctic “ozone hole” appeared and an international science assessment more strongly linked the release of CFCs and ozone depletion. It became evident that a stronger worldwide response was needed. In 1987, the Montreal Protocol was signed and the signatory nations committed themselves to a reduction in the use of CFCs and other ozone-depleting substances. Since that time, the treaty has been amended to ban CFC production after 1995 in the developed countries, and later in developing. Today, over 160 countries have signed the treaty. Beginning January 1, 1996, only recycled and stockpiled CFCs will be available for use in developed countries like the US. This production phase-out is possible because of efforts to ensure that there will be substitute chemicals and technologies for all CFC uses.

Will the ozone layer recover? Can we make more ozone to fill in the hole?

The answers, in order, are: yes and no. We can't make enough ozone to replace what's been destroyed, but provided that we stop producing ozone-depleting substances, natural ozone production reactions should return the ozone layer to normal levels by about 2050. It is very important that the world comply with the Montreal Protocol; delays in ending production could result in additional damage and prolong the ozone layer's recovery.