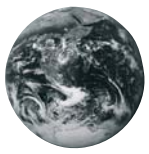
OUR ENVIRONMENT OUR HERITAGE



THE OZONE LAYER

WHAT IS THE OZONE AND WHERE IS IT IN THE ATMOSPHERE?

Ozone is a gas that is naturally present in our atmosphere. Each ozone molecule contains three atoms of oxygen and it denoted chemically as O3. Ozone is found primarily in two regions of the atmosphere. About 10% of atmospheric ozone is in the troposphere, the region closest to Earth (from the surface to about 10-16 kilometres (6-10 miles)). The remaining ozone (90%) resides in the stratosphere, primarily between the top of the troposphere and about 50 kilometres (31 miles) altitude. The large amount of ozone in the stratosphere is often referred to as the "ozone layer"

HOW IS OZONE FORMED IN THE ATMOSPHERE?

Ozone is formed throughout the atmosphere in multi-step chemical processes that requires sunlight. In the stratosphere, the process begins with and oxygen molecule (O2) being broken apart by ultraviolet radiation from the Sun. in the lower atmosphere (troposphere), ozone is formed in a different set of chemical reactions involving hydrocarbons and nitrogen-containing gases.

WHAT IS STRATOPHERIC OZONE?

Stratospheric ozone is naturally formed in chemical reactions involving ultraviolet sunlight and oxygen molecules, which make up 21% of the atmosphere. In the first step sunlight breaks apart one oxygen molecules O2 to produce two oxygen atoms. In the second step, each atom combines with an oxygen molecule to produce an ozone molecule. These reactions occur continually wherever ultraviolet sunlight is present in the stratosphere. As a result the greatest ozone production occurs in the tropical stratosphere.

WHY DO WE CARE ABOUT ATMOSPHERIC OZONE?

Ozone in the stratosphere absorbs some of the Sun's biologically harmful ultraviolet radiation. Because of this beneficial role stratospheric ozone is considered "good" ozone. In contrast, excess ozone at Earth's surface that is formed from pollutants is considered "bad" ozone because it can be harmful to human, plants, and animals/ the ozone that occurs naturally near the surface and in the lower atmosphere is also beneficial because ozone helps remove pollutants from the atmosphere.

IS TOTAL OZONE UNIFROM OVER THE GLOBE?

No, the total amount of ozone above the surface of the Earth varies with location on time scales that range from daily to seasonal and longer. The variations are caused by stratospheric winds and the chemical production and destruction of ozone. Total ozone is generally lowest at the equator and highest near the poles because of the seasonal wind patterns in the stratosphere.

HOW IS OZONE MEASURED IN THE ATMOSPHERE?

The amount of ozone in the atmosphere is measured by instruments on the ground and carried aloft on balloons, aircrafts, and satellites. Some measurements involve drawing air into an instrument that contains a system for detecting ozone. Other measurements are based on ozone's unique absorption of light in the atmosphere. In that case, sunlight or laser light is carefully measured after passing through a portion of the atmosphere containing ozone.

WHAT ARE THE PRINCIPAL STEPS IN STRATOSPHERIC OZONE DEPLETION CAUSED BY HUMAN ACTIVITIES?

The initial step in the depletion of stratospheric ozone by human activities is the emission, at Earth's surface, of ozone depleting gases containing chlorine and bromine. Most of these gases accumulate in the lower atmosphere because they are uncreative and do not dissolve readily in rain or snow. Eventually, these emitted sources gases are transported to the stratosphere, where they are converted to more reactive gases containing chlorine and bromine. These more reactive gases then [participate in reactions that destroy ozone, finally, when air returns to the lower atmosphere, these reactive chlorine and bromine gases are removed from Earths atmosphere by rain and snow.

WHAT EMISSIONS FROM HUMAN ACTIVITIES LEAD TO OZONE DEPLETION?

Certain industrial processes and consumer products result in the emission of "halogen source gases" to the atmosphere. These gases bring chlorine and bromine to the stratosphere, which cause depletion of the ozone layer. For example, chlorofluorocarbons (CFC's) once used in almost all refrigeration and air conditioning systems, eventually reach the stratosphere, where they are broken apart to release ozone-depleting chlorine atoms. Other examples of human-produced ozone-depleting gases are the "halons," which are used in fire extinguishers and contain ozone-depleting bromine atoms. The production and consumption of all principal halogen source gases by human activities are regulated worldwide under the Montreal Protocol.

WHAT ARE REACTIVE HALOGEN GASES THAT DESTROY THE STRATOSPHERIC OZONE?

Emissions from human activities and natural processes include large sources of chlorine- and bromine-containing gases that eventually reach the stratosphere. When exposed to ultraviolet radiation from the Sun, these halogen source gases are converted to move reactive gases also containing chlorine and bromine. Important examples of the reactive gases that destroy stratospheric ozone are chorine monoxide (CIO) and bromine monoxide (BrO) these reactive gases participate in "catalytic" reaction cycles that efficiently destroy ozone. Volcanoes can emit some chlorine-containing gases, but these gases are ones that readily dissolve in rainwater and ice and are usually "washed out" of the atmosphere before they can reach the stratosphere.

WHAT ARE THE CHLORINE AND BROMINE REACTIONS THAT DESTROY STRATOSPHERIC OZONE?

Reactive gases containing chlorine and bromine destroy stratospheric ozone in "catalytic" cycles made up of two or more separate reactions. As a result, a single chlorine or bromine atom can destroy many hundreds of ozone molecules before it reacts with another gas, breaking the cycle. In this way, a small amount of reactive chlorine or bromine has a large impact of the ozone layer. Certain ozone destruction reaction become most effective in popular regions because the reactive gas chlorine monoxide reaches very high levels there in the late winter/early spring seasons.

AN ALARMING DISCOVERY?

Everybody in the earth is concerned and affected by the consequences of ozone layer depletion. However, some regions of the world are already more severely affected. During the 1980s, scientists discovered an extremely alarming thinning of the ozone layer over the region of the Antarctica (Southern pole of the globe). Since then, they have proved that every year in the spring when ozone layer depletion process is at its highest, at least 50% of the ozone layer is destroyed over Antarctica: this is called the "ozone hole".

The Ozone layer is thinning severely over many regions and countries where people live: parts of South America, Australia, News Zealand and South Africa are particularly affected. Over North America, Europe and Asia the ozone layer is also getting thinner.

The consequences of this phenomenon can be dreadful: the more the ozone layer is depleted, the more the people who live in these regions and countries are exposed to increased amounts of damaging UV rays.

OUR ENVIRONMENT OUR HERITAGE

Children's Corner

Children aged 9-15 are invited to answer the following corner. The name of 3 students with top scores at the end of every month will be posted under the "Children's Corner" for special prizes. "2010 Young Environmentalist Star Awards" will be given to 10 students with top total scores at the end of the year.

Ozone effects: Protect yourself

FILL-IN-THE-GAPS

Fill in the missing gaps with appropriate words

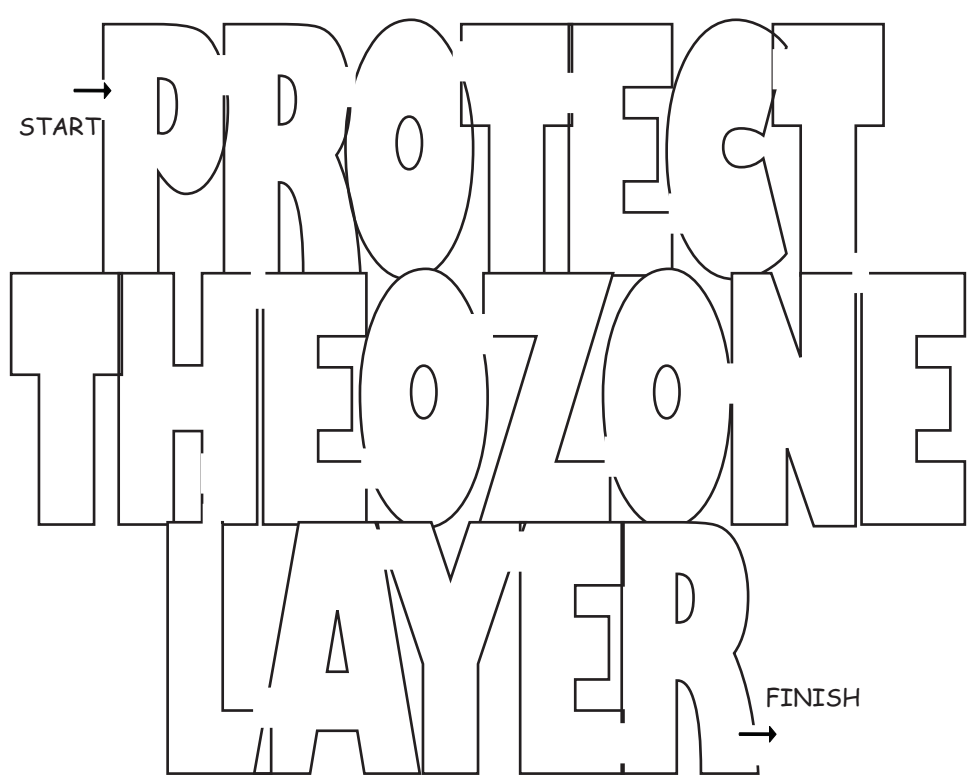
Ozone is formed throughout the _____ in multi-step _____ processes that requires sunlight. In the stratosphere, the process _____ with and oxygen _____ being broken apart by ultraviolet radiation from the ___. In the _____ atmosphere (troposphere), ozone is _____ in a different set of chemical reactions involving hydrocarbons and nitrogen-containing _____.

The amount of _____ in the atmosphere is measured by _____ on the ground and carried aloft on balloons, _____, and satellites. Some measurements involve drawing air into an instrument that contains a system for _____ ozone.

Other measurements are based on ozone's unique absorption of light in the _____. In that case, sunlight or laser light is carefully _____ after passing through a portion of the _____ containing ozone.

MAZE

Can you find your way through this word maze?



OZONE - QUIZ

Who knows?.....Challenge

1. The Ozone Layer is located in the _____ sphere.
2. The Ozone Layer protects us from _____ of the sun.
3. Name two of the gases that depletes the ozone _____ _____
4. State one way humans can help prevent the ozone from depleting?
5. Is UV radiation high or low when your shadow is shorter than you?
6. Do shade trees block 100% of UV rays?

CONGRATULATIONS!!!!!!

To our last month's winners - please uplift your prizes at our office DBS building - Level 3 - Happy Sunday Kids & GO MANU SAMOA!!

- ★ Cordelia Schuster
- ★ Palepua Solaese
- ★ Neva Sailimalo

ACKNOWLEDGEMENTS

We wish to ackowledge the following companies for sponsoring our Children's Corner prizes

- SAMOA STATIONERIES LTD
- McDONALD'S RESTAURANT
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