International Day for the Preservation of the Ozone Layer

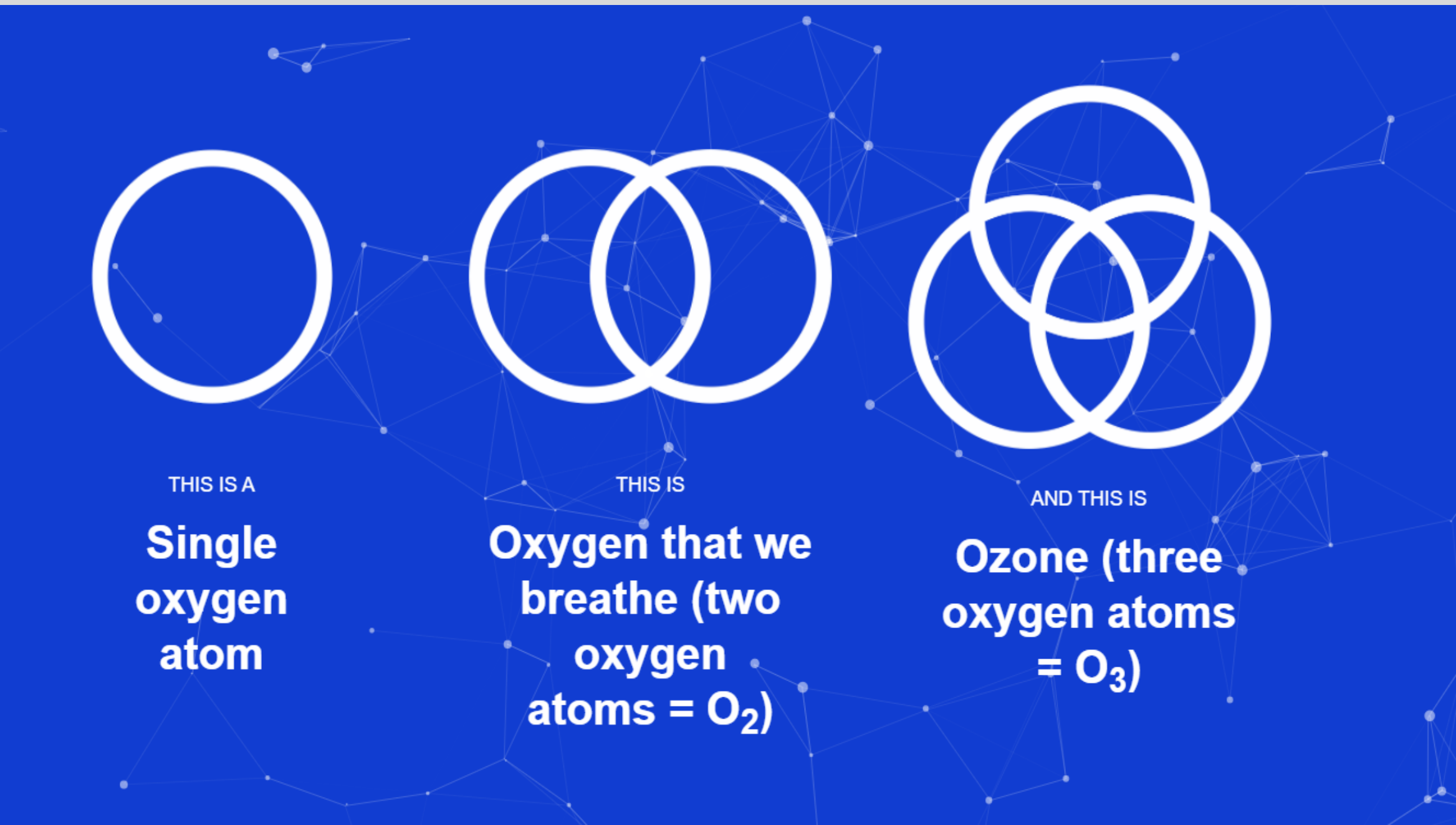
16 September 2021

THEME: MONTREAL PROTOCOL- KEEPING US, OUR FOOD AND VACCINES COOL

ALL ABOUT THE OZONE LAYER

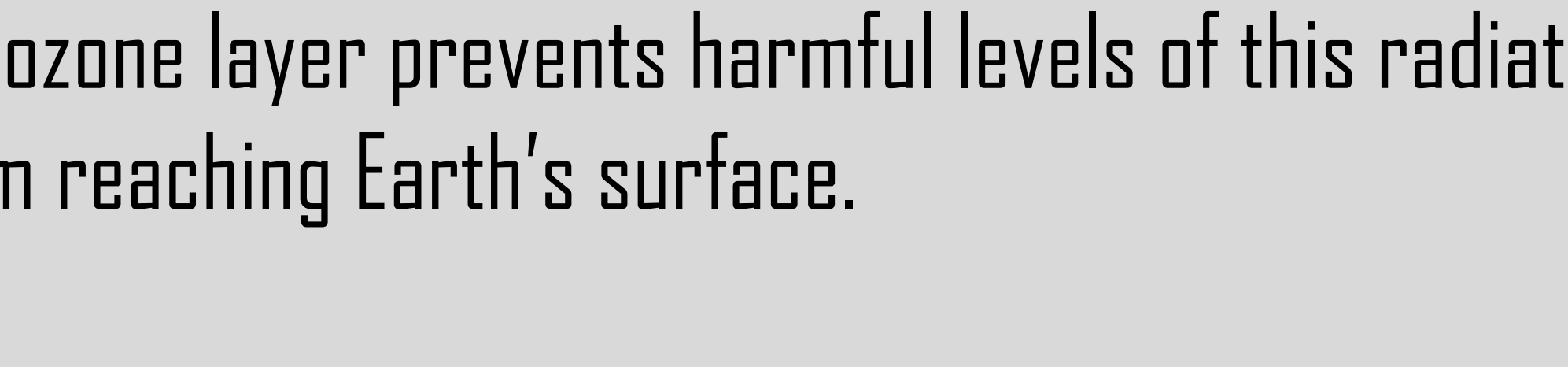
WHAT IS THE OZONE LAYER?

The ozone layer is a region of high ozone concentration in the stratosphere, 15 to 35 kilometres above Earth's surface. The ozone layer acts as an invisible shield and protects us from harmful ultraviolet (UV) radiation from the sun.



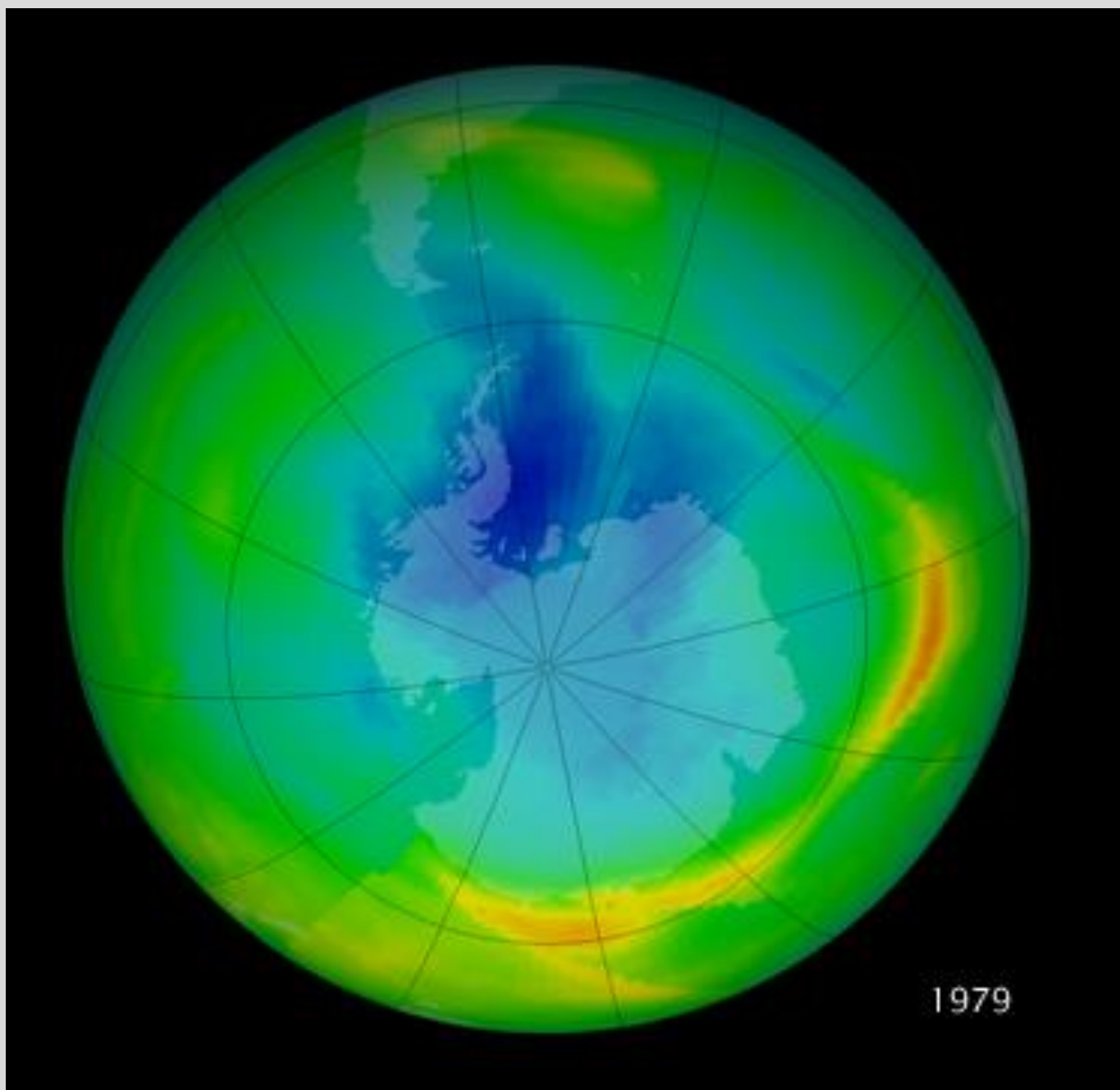
How does ozone protect us from UV-B?

Ozone absorbs UV-B radiation from the sun. When an ozone molecule absorbs UV-B, it comes apart into an oxygen molecule (O2) and a separate oxygen atom (O). Later, the two components can reform the ozone molecule (O3). By absorbing UV-B in the stratosphere, the ozone layer prevents harmful levels of this radiation from reaching Earth's surface.



Ozone depletion and the “ozone hole”

In the mid-1970s, scientists realised that the ozone layer was threatened by the accumulation of gases containing halogens (chlorine and bromine) in the atmosphere. Then, in the mid-1980s, scientists discovered a “hole” in the ozone layer above Antarctica – the region of Earth’s atmosphere with severe depletion.

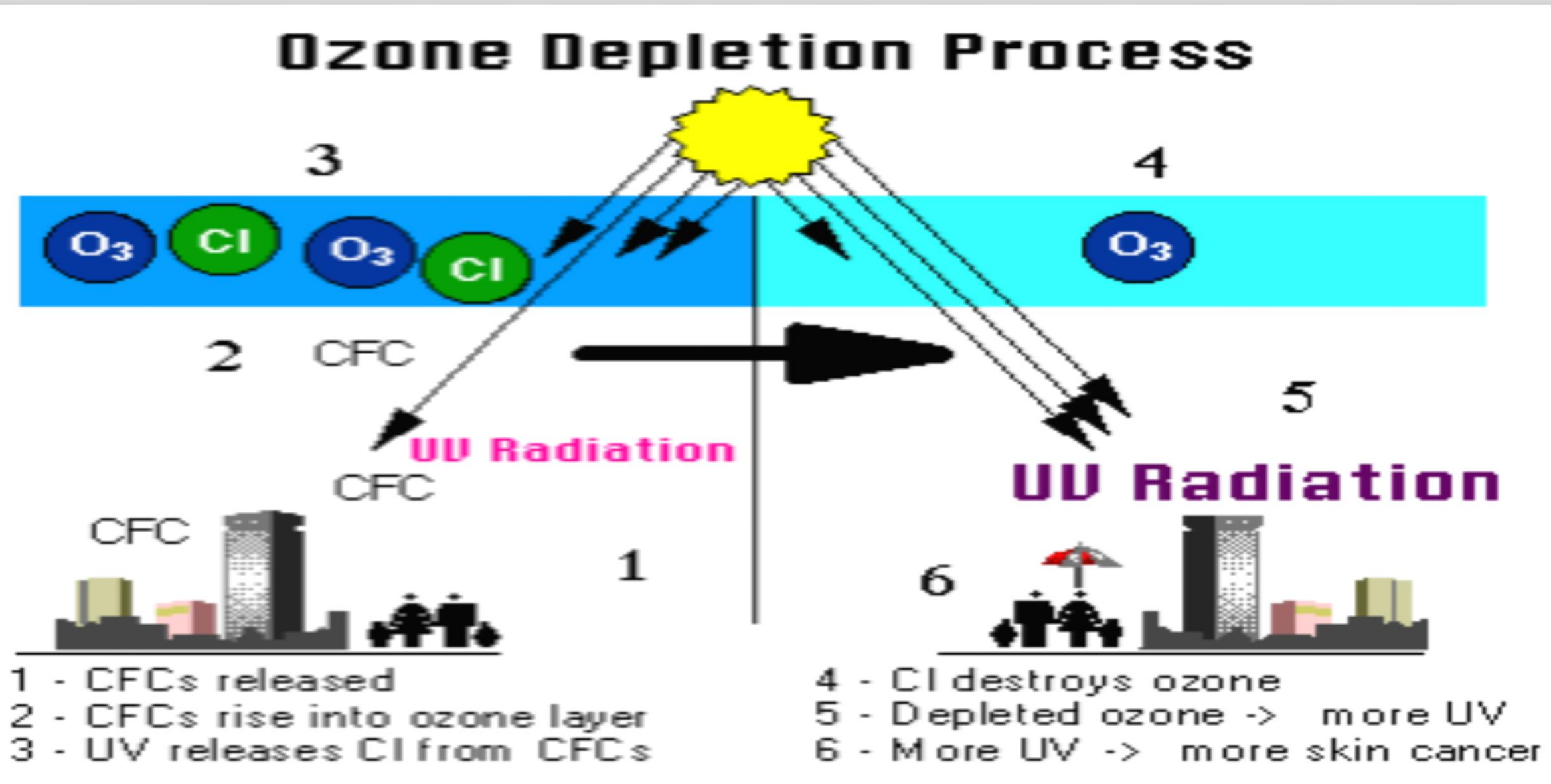


So, what causes the thinning of the ozone layer around the globe and the “ozone hole” above Antarctica?

Manmade chemicals containing halogens were determined to be the main cause of ozone loss. These chemicals are collectively known as ozone-depleting substances (ODSs). ODSs were used in literally thousands of products in people’s daily lives around the world. The most important ODSs were chlorofluorocarbons (CFCs), which at one time were widely used in air conditioners, refrigerators, aerosol cans, and in inhalers used by asthma patients. Other chemicals, such as hydrochlorofluorocarbons (HCFCs), halons and methyl bromide also deplete the ozone layer. Most of our computers, electronics and parts of our appliances were cleaned with ozone-depleting solvents. Car dash boards, insulation foams in our houses and office buildings, water boilers and even shoe soles were made using CFCs or HCFCs. Offices, computer facilities, military bases, airplanes and ships extensively used halons for fire protection. A lot of the fruit and vegetables we ate were fumigated by methyl bromide to kill pests.

How do these chemicals deplete ozone?

When a CFC molecule reaches the stratosphere, it eventually absorbs UV radiation, causing it to decompose and release its chlorine atoms. One chlorine atom can destroy up to 100,000 ozone molecules. Too many of these chlorine and bromine reactions disrupt the delicate chemical balance that maintains the ozone layer, causing ozone to be destroyed faster than it is created.



Damage to human health and well-being

Skin cancers

There are strong links between over-exposure to UV radiation and the development of the three most common forms of skin cancer (malignant melanoma, basal cell carcinoma and squamous cell carcinoma).

Eye disease

Exposure to high levels of UV radiation leads to an increased risk of cataracts.

Damage to food security

Increased exposure to UV radiation can damage aquatic food chains and cause direct damage to crustaceans and fish eggs.

Damage to our environment

Just as uncontrolled ozone depletion threatens food production, it also threatens plants, animals and microbes in natural ecosystems.

Damage to outdoor materials

Exposure to UV-B also damages natural and synthetic materials. Vulnerable materials include wood, plastic, rubber and even the materials used in some solar panels. These materials, widely used in buildings, agriculture and commercial products, are already designed to minimize the damage caused by UV.

Ecosystems

Large-scale increases in UV-B could alter the exchange of carbon dioxide between the atmosphere and the biosphere. Increased UV radiation also stimulates the breakdown of decaying leaves and other organic matter.

Life below water

In the oceans, lakes and rivers UV-B has adverse effects on many different aspects of the biology of organisms across the food web.

Life on land

As with crops, wild plants are able to cope with current levels of UV-B radiation, but their growth can be reduced by large increases in UV-B.

The Solution

In the 1980s, the global community decided to do something about ozone depletion. With growing evidence that CFCs were damaging the ozone layer and understanding of the many consequences of uncontrolled depletion, scientists and policy makers urged nations to control their use of CFCs. In response, the Vienna Convention for the Protection of the Ozone Layer was adopted in 1985, followed by the Montreal Protocol on Substances that Deplete the Ozone Layer in 1987. They are the first international environmental treaties to be universally endorsed by 198 nations of the world.

THE
Vienna Convention

The Vienna Convention for the Protection of the Ozone Layer was adopted in 1985 and entered into force in 1988. Nations that signed the Convention – called the parties – agreed to research and monitor the effects of human activities on the ozone layer and to take concrete action against activities that are likely to have adverse effects on the ozone layer.

The Convention did not require countries to take specific actions to control ozone-depleting substances. The specific actions are spelled out by the Montreal Protocol.

THE
Montreal Protocol

The Montreal Protocol on Substances that Deplete the Ozone Layer is a global agreement to protect Earth's ozone layer by phasing out the consumption and the production of most chemicals that deplete it. The landmark agreement was signed on 16 September 1987 – marked globally as the World Ozone Day - and entered into force in 1989. The Protocol provides a set of practical, actionable tasks to phase out ozone-depleting substances that were universally agreed upon.

The Protocol is unique in having the flexibility to respond to new scientific information. Since its inception the Protocol has successfully met its objectives, and continues to safeguard the ozone layer today.

THE
Kigali Amendment

Although the Montreal Protocol was designed to phase out the production and consumption of ODSs, some replacements of these substances, known as hydrofluorocarbons (HFCs), have proven to be powerful greenhouse gases. In fact, some HFCs are more than a thousand times more potent than carbon dioxide in contributing to climate change.

After several years of effort, the parties agreed on 15 October 2016 to amend the Protocol to include control measures to reduce HFCs (the Kigali Amendment). A successful HFC phasedown is expected to avoid up to 0.4 degree Celsius of global temperature rise by 2100, while continuing to protect the ozone layer.

With the full and sustained implementation of the Montreal Protocol, the ozone layer is projected to recover by the middle of this century. Without this treaty, ozone depletion would have increased tenfold by 2050 compared to current levels.

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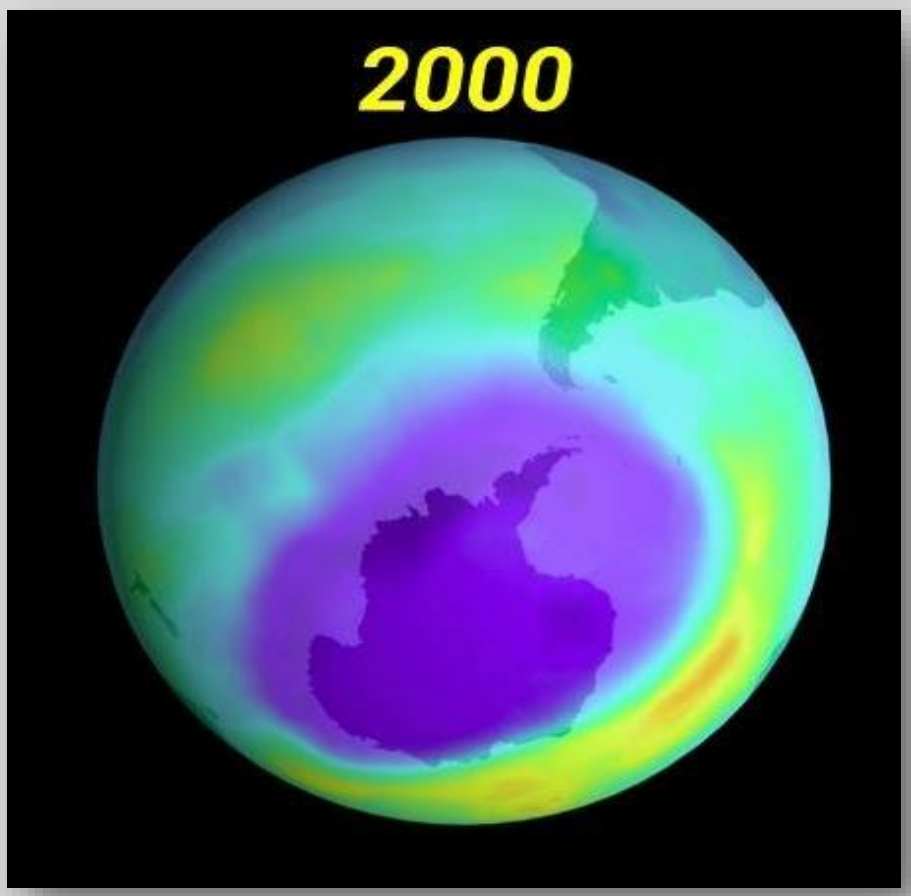

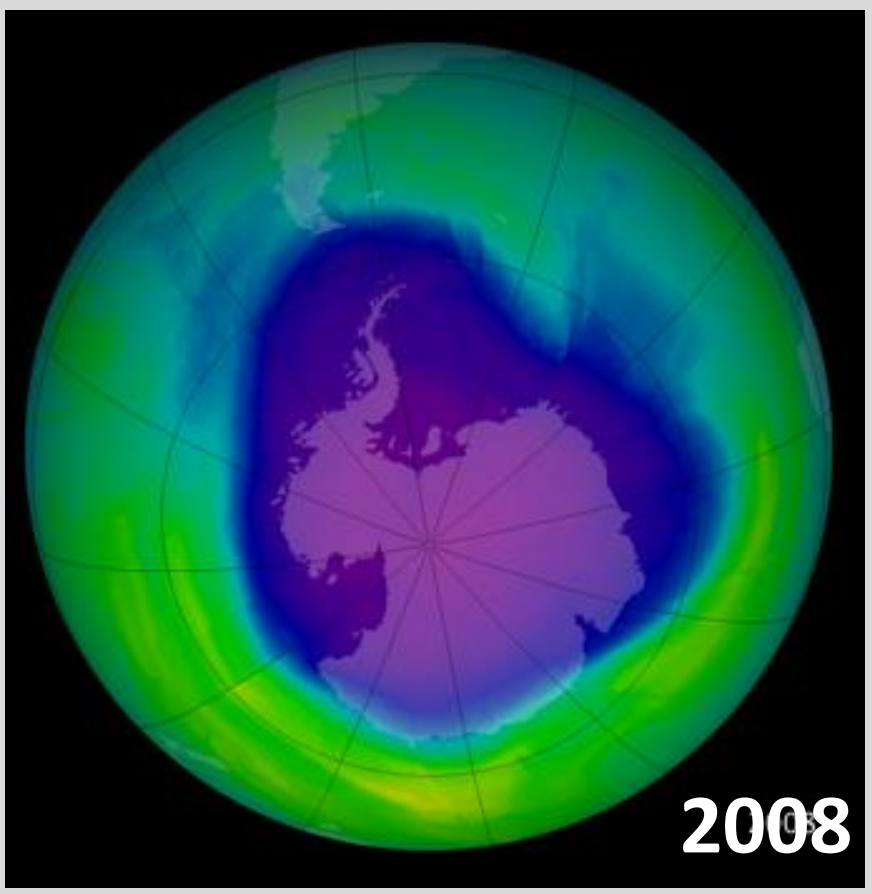

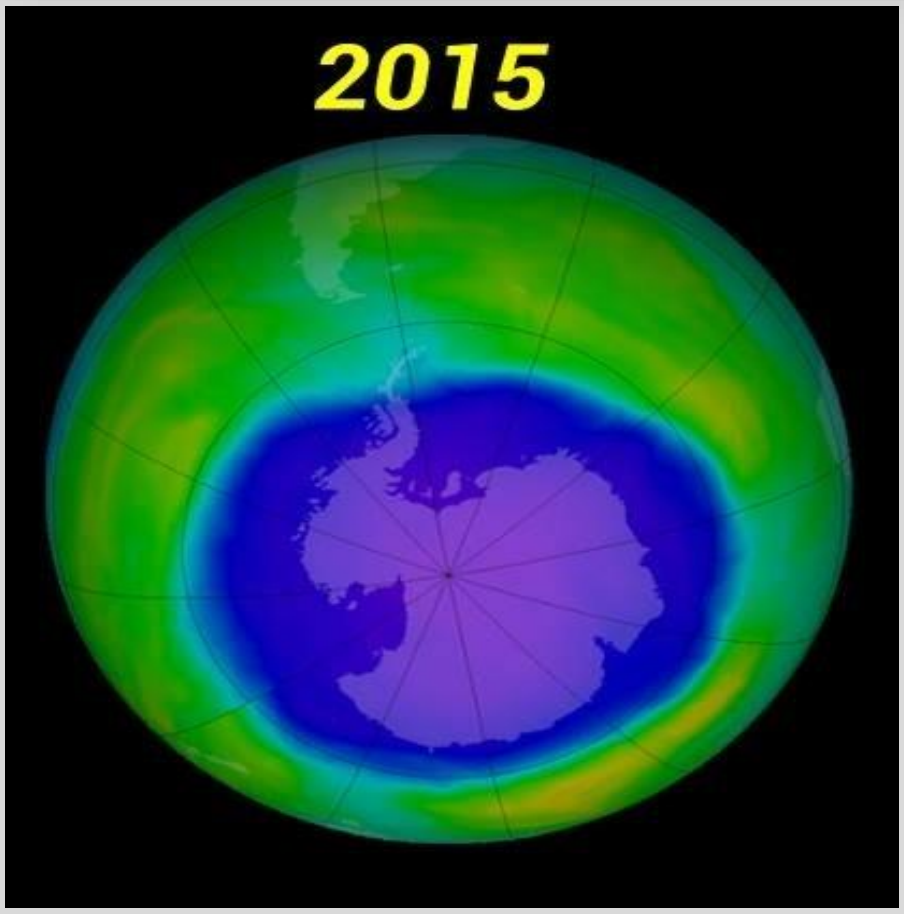

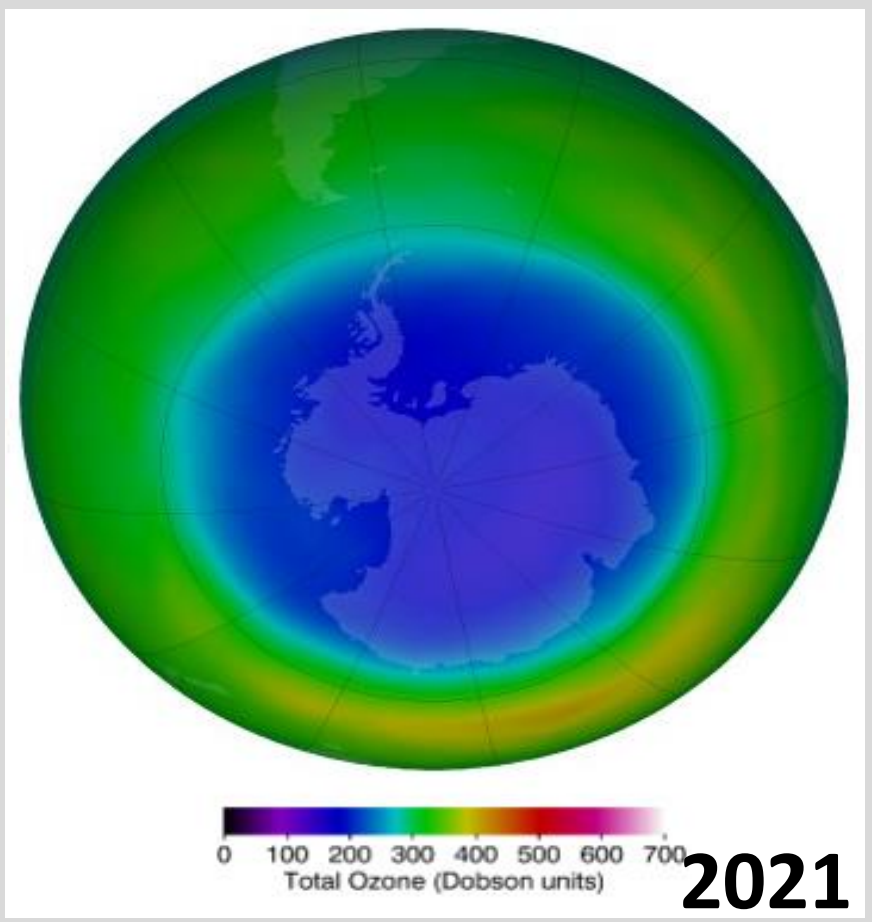

Source: ozone.unep.org

This year's theme is Montreal Protocol- keeping us, our food and vaccines cool.

Around one third of all food produced globally for human consumption is either lost or wasted each year, largely due to a lack of access to cold chains. Food loss and waste amounts to billions of US dollars a year; not only wasting precious resources such as land, water and energy, but also generating an estimated 8 per cent of total greenhouse gases per year globally.

By developing cold chain solutions that are more efficient, more climate friendly, and cheaper to buy and operate, cold chains will become more effective and widely available. This will provide producers such as farmers and pharmaceutical providers with access to pre-cooling, refrigerated storage and refrigerated transport – ensuring products such as food and vaccines reach people in safe and good condition.

On this World Ozone Day, let us celebrate and acknowledge the Montreal Protocol and its Kigali Amendment in its wider efforts to keep us, our food, and vaccines cool!

Source: ozone.unep.org

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