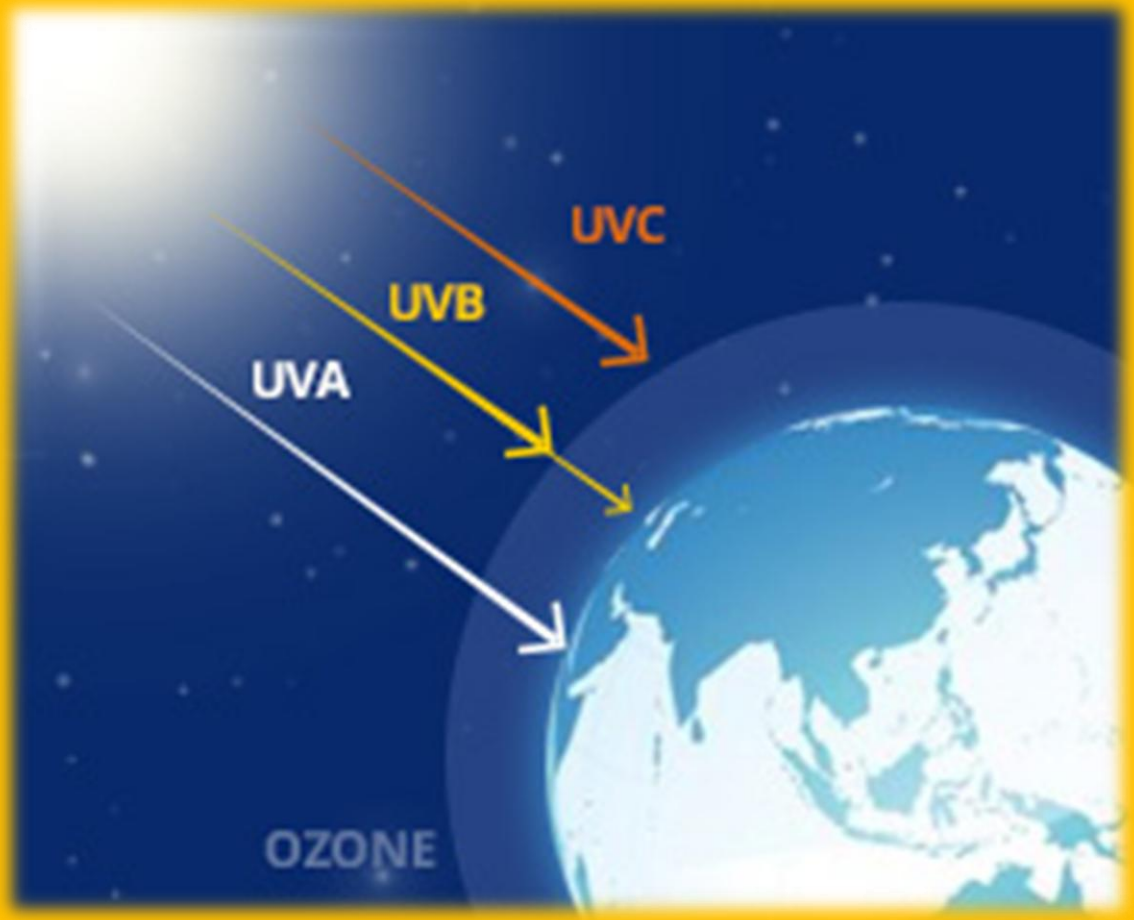
Ultraviolet Radiation



The Story of UV Radiation

Ultraviolet= ***"beyond violet"***

***UV* radiation:**

-invisible light that comes from the Sun.

-causes sunburn, and large exposure can cause skin cancer.

-causes the body to form vitamin D.

The Story of Ozone

This is how ozone in the stratosphere is made.

1. UV radiation hits an O_2 molecule and gives it energy

2. The O_2 molecule splits into two oxygen atoms

3. Each energized oxygen atom moves around quickly until it runs into another O_2 molecule and reacts to form O_3

Ozone to the rescue!

- Ozone absorbs 99% of harmful UV rays from the sun
- Ozone is mainly found in ozone layer (Stratosphere) is about 10 to 20 km thick
- Remember: thinning of the ozone layer is the result of chlorofluorocarbons containing chlorine, fluorine, and carbon

CFC's (Chlorofluorocarbons)

CFC molecules are mainly used as coolant in some refrigerators, in the manufacturing of some plastics and foams, and in aerosol cans (in some countries)

CFC's are also found in:

Rigid Foam Insulation Solvents

Air Conditioning Flexible Foam

Other Products

The Story of Oxygen

Oxygen makes up about 21% of our atmospheric gases. It is a highly reactive element that *rapidly* combines with other atoms and molecules.

OXYGEN IS VERY REACTIVE!!!

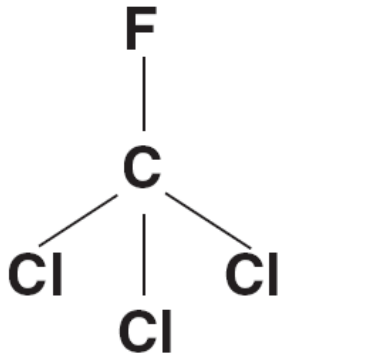
O = Oxygen atom

O_2 = Oxygen Gas Molecule

O_3 = Ozone

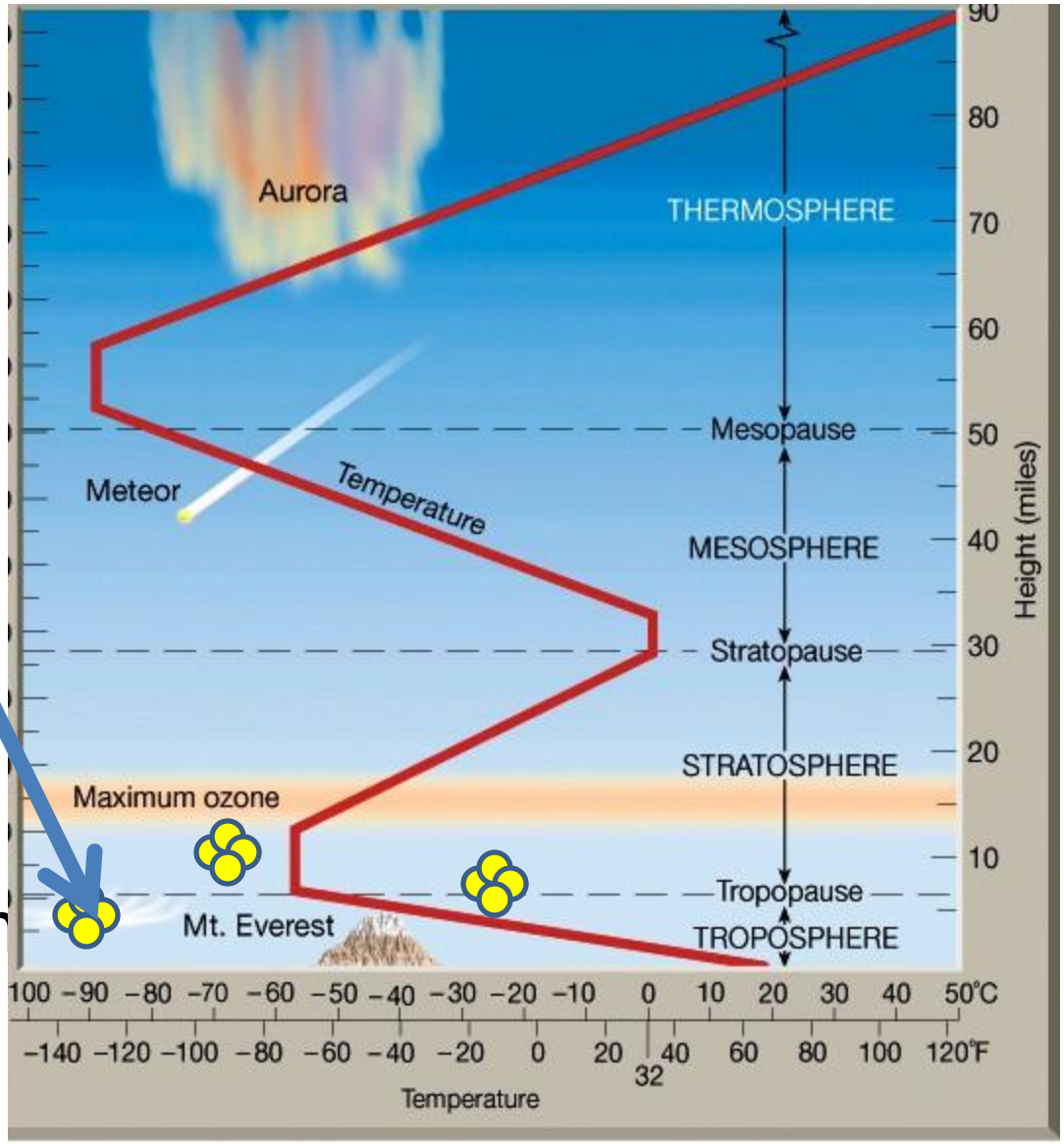
The Story of the CFC's, UV Radiation, and Ozone

Chlorofluorocarbons (CFC's)

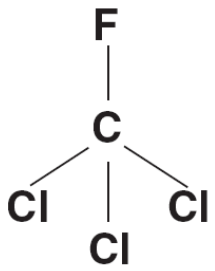


Chlorofluorocarbon (CFC)

When CFC's are released into the air, the ozone layer protects them from the sun's UV radiation

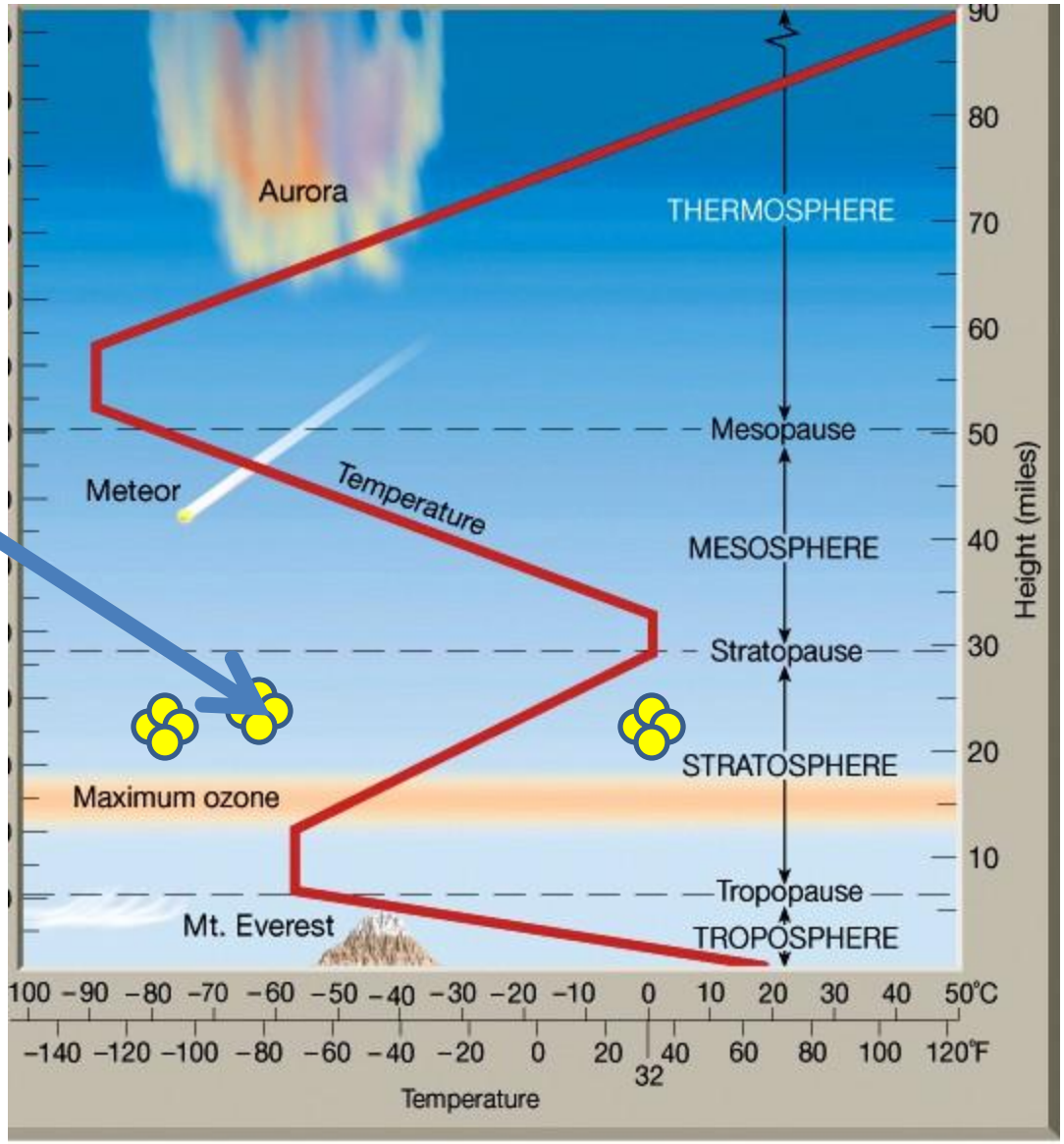


Chlorofluorocarbons (CFC's)

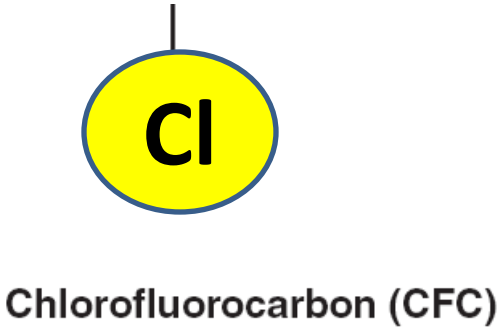


Chlorofluorocarbon (CFC)

Eventually the CFC's travel through the stratosphere and pass into the ozone layer.



Chlorofluorocarbons (CFC's)



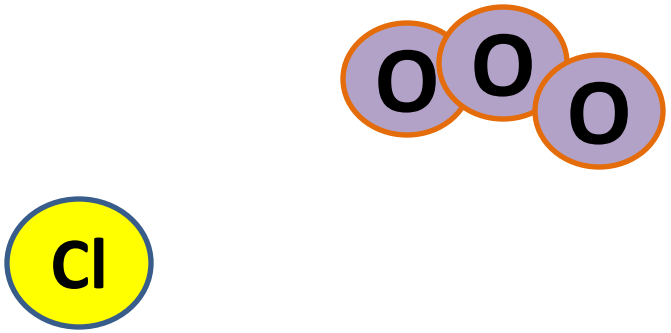
Chlorofluorocarbon (CFC)

- When UV radiation hits the CFC's, the chlorine atoms are released into the ozone layer

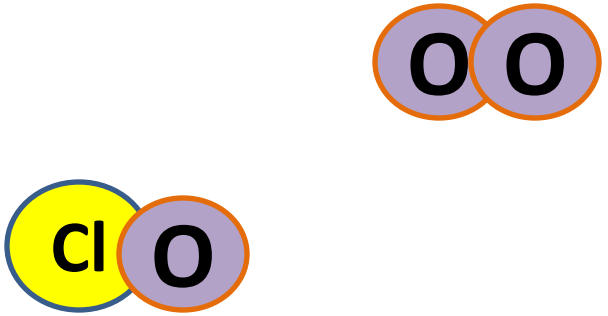
Chlorofluorocarbons (CFC's)

The released chlorine atoms react with the O_3 (ozone) molecules and <u>destroy ozone</u> by stealing an oxygen atom!

Before



After



Chlorofluorocarbons (CFC's)

When the Chlorine Monoxide meets a single Oxygen atom, the chlorine is released and and oxygen molecule forms.

Before

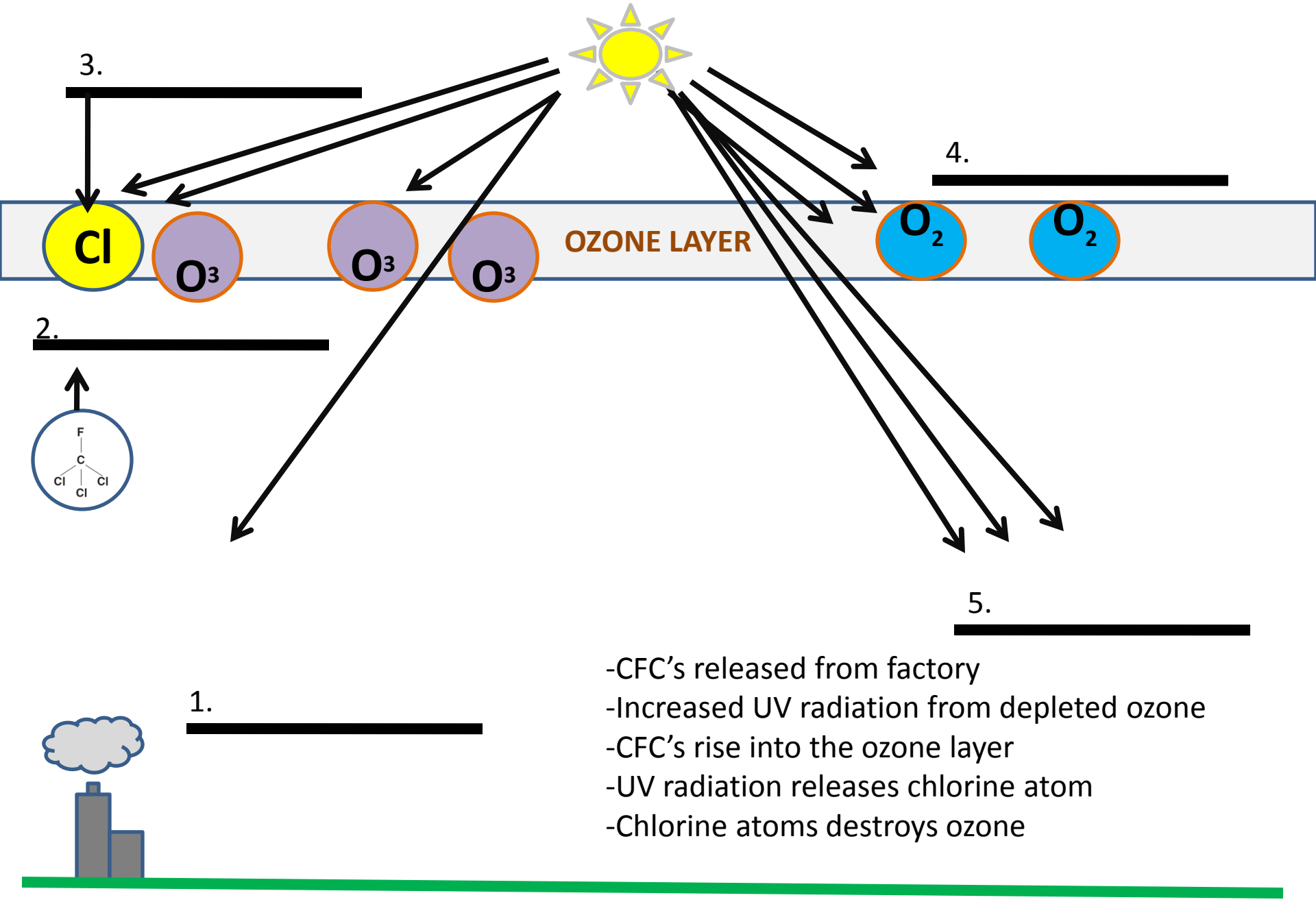
After

Chlorofluorocarbons (CFC's)

Still no ozone! So the chlorine is free to again react with a new ozone molecule and destroy even more ozone.

Before

After



-CFC's released from factory
-Increased UV radiation from depleted ozone
-CFC's rise into the ozone layer
-UV radiation releases chlorine atom
-Chlorine atoms destroys ozone