PRODUCED BY:
National Ozone Unit
Ministry of Health, Wellness and the Environment
Kingstown, St. Vincent and the Grenadines

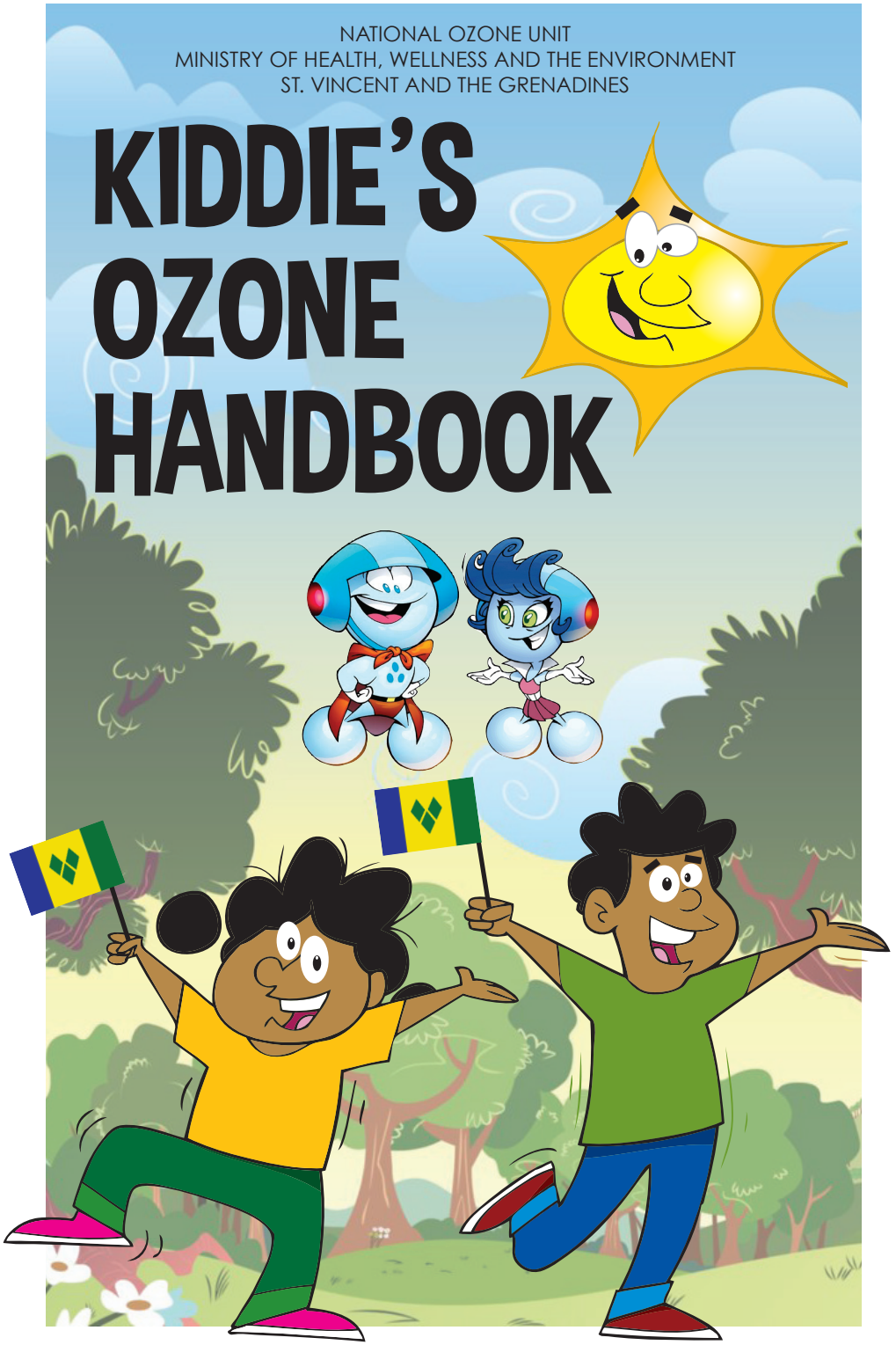
ILLUSTRATIONS:
Ken Dyer

National Ozone Unit
Public Health Complex
Linley Street (Downtown Kingstown), Kingstown
Phone: (784) 485-6992 • Fax: (784) 456-1785
Email: nousvg@gmail.com

Support provided by the Pan American Health Organization (PAHO)

NATIONAL OZONE UNIT
MINISTRY OF HEALTH, WELLNESS AND THE ENVIRONMENT
ST. VINCENT AND THE GRENADINES

KIDDIE'S OZONE HANDBOOK

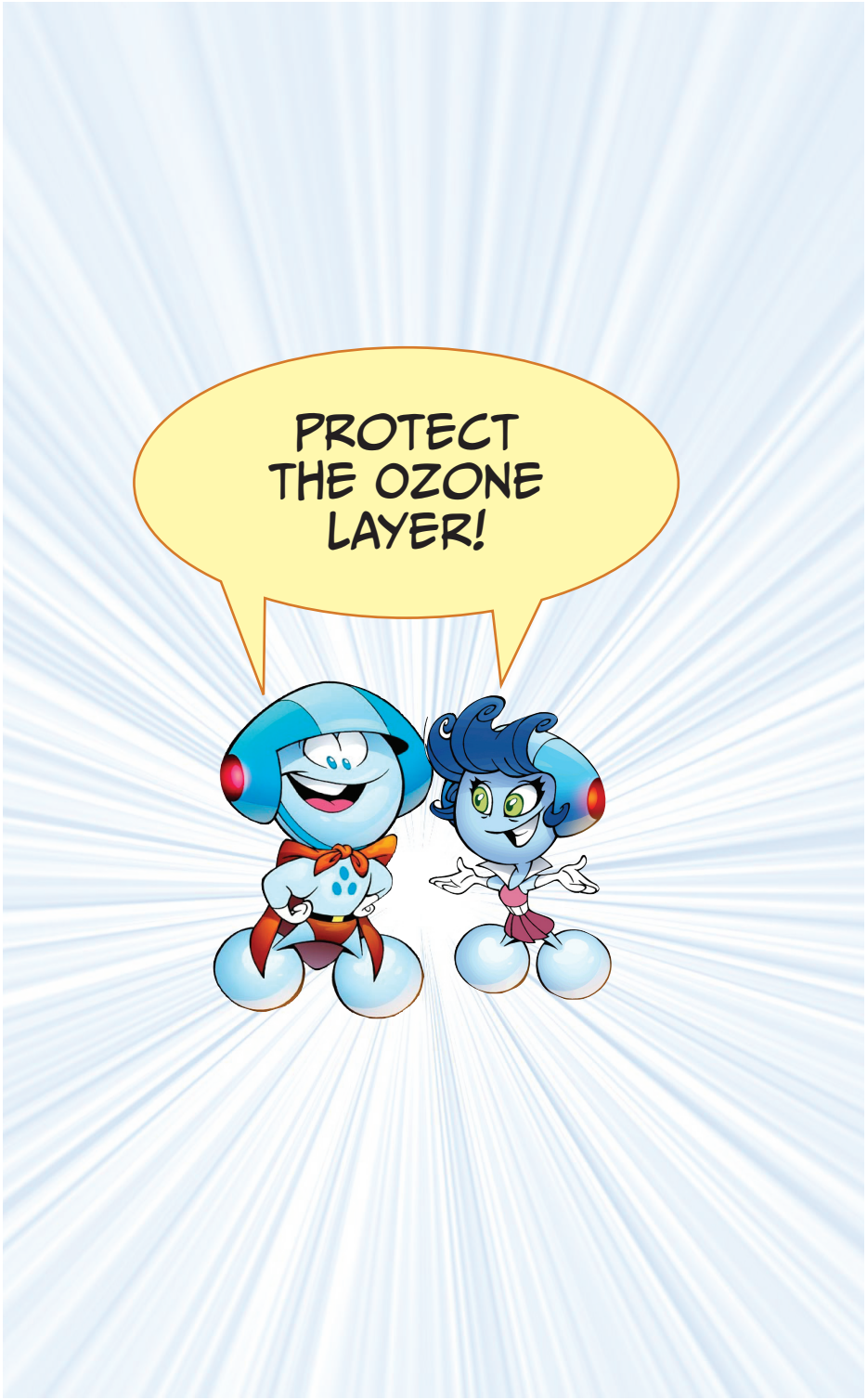


In 1987, 16th September, Governments across the globe adopted the Montreal Protocol on Substances that Deplete the Ozone Layer to reduce and eventually phase out the production and consumption of Ozone Depleting Substances (ODS). The Protocol entered in to force on January 1st, 1989. By controlling the abundance of ODS in the atmosphere, the earth's fragile Ozone Layer could be protected.

St. Vincent and the Grenadines (SVG) signed on to the Montreal Protocol on September 5th, 1996, and has since successfully completed the Refrigeration Management Plan (RMP) and the Terminal Phase-out Management Plan (TPMP) for the phase-out of Chlorofluorocarbon (CFC). Having done this, SVG was granted approval by the Multilateral Fund Secretariat (MLF) for an accelerated Hydrochloroflurocarbon Phase-out Management Plan (HPMP) for HCFC, becoming the first in the Region of Latin America and the Caribbean to do so.

Under the HPMP, St. Vincent and the Grenadines will conduct these activities:

- Training & certification of Refrigeration and Air-conditioning Technicians.
- Training of Customs Officers, Importers and Customs Brokers.
- Establishment of Recovery Centers with St. Vincent and the Grenadines.
- Provision of equipment for Recovery, Recycling and Retrofitting for the promotion of "Good Practices".
- Public Education and Awareness activities.



WORD SEARCH PUZZLE

G E L S T R A T O S P H E R E I B C N Y Q N A C
Y K S R U O E V A S Y V V Z D B W A M F R O J Z
H T L A E H F O Y R T S I N I M T P F A O Z C F
B F S N J K X G J M T B A S D I K S R N D O Q K
G Q Y M P D I V Z N Y N E X O A M X E Z A N O G
I V C X H F E N Z F O L E N C I V S C A N E D S
L F H D A S I P C S U L A M Z R H N I H S L D I
L V W J S S A Z L C N L D I N C U P F N K A H V
E M F F E X V P E E O W H X J O U Y F P I Y P T
G K G Y O F P L D Z T G P L T N R O O H K E N N
A O K V U G O K O Q I I J V V D V I L D R R R A
L R Z P T M N N X D U O O H D I Q P V G G Y S L
T L H Z L V E E K G I V C N V T B T H N I O Y L
R Y N R Y U G A T O M S G G Q I B Y X C E Q A E
A A S T N A R E G I R F E R D O Y P S C Y E R P
D T N I T I C O X Y G E N G Z N B W K Z G R V O
E M T I V P G V M E O Z M Z Z E U U V Y X S U R
Z O N N T C B H Z B S S I R V R B C Q Y Y F G P
N S M R E F R I G E R A T O R S G I G D G R T I
H P A E G I X H M O N T R E A L P R O T O C O L
J H U D I N C P H L R E G U L A T I O N S T C P
G E Y N I F M M B N J A J T E C H N I C I A N S
W R I G C T L S M U G G L I N G Z R Y J F L H M
P E Q K S C G S E V I T A N R E T L A N A E L C

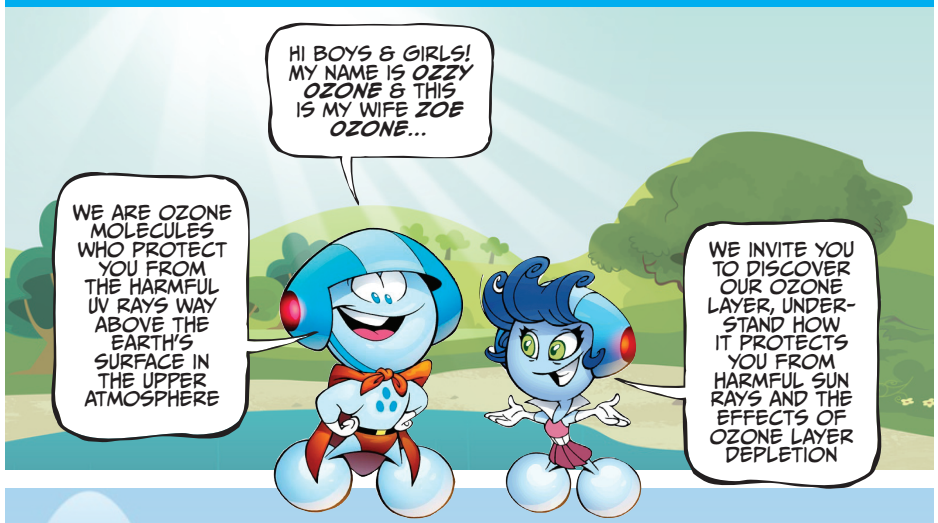
air conditioners	molecules	refrigerants
atmosphere	montreal protocol	refrigerators
atoms	national ozone unit	regulations
clean alternatives	officer	save our sky
depletion	oxygen	smuggling
environment	ozone layer	stratosphere
hcfc	ozzy	technicians
illegal trade	phase out	uv rays
ministry of health	propellant	zoe

Down
1. Zoe Ozone
2. Depletion
4. HCFC
6. Stratosphere
7. Ozone molecule
9. UV Rays

Across
3. Ozone
5. Ozzy Ozone
8. Montreal Protocol
10. Phase out
11. NOU
12. Refrigerants

Table of Contents

WHAT IS OZONE?

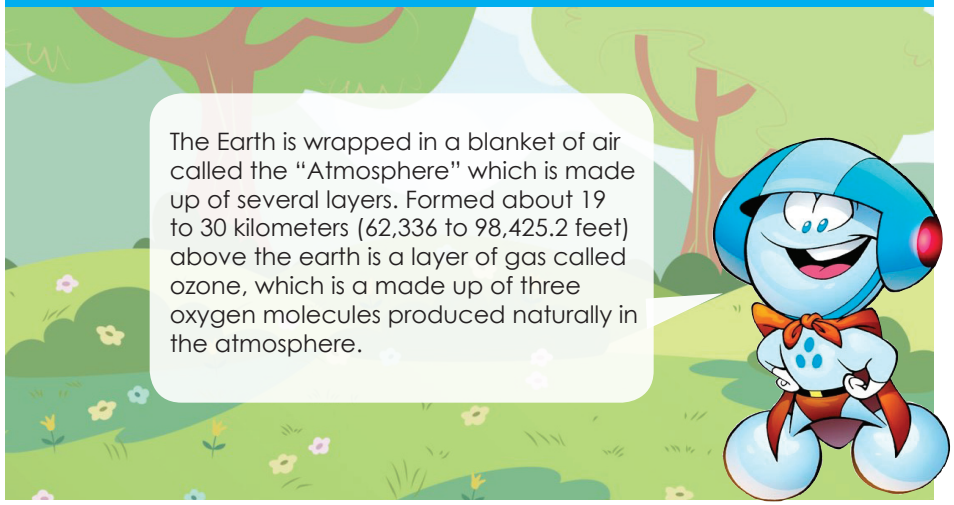


Ozone is a natural gas that is found in 2 different layers of the atmosphere. In the layer near the earth known as the troposphere the bad ozone dirty the air and help make smog.

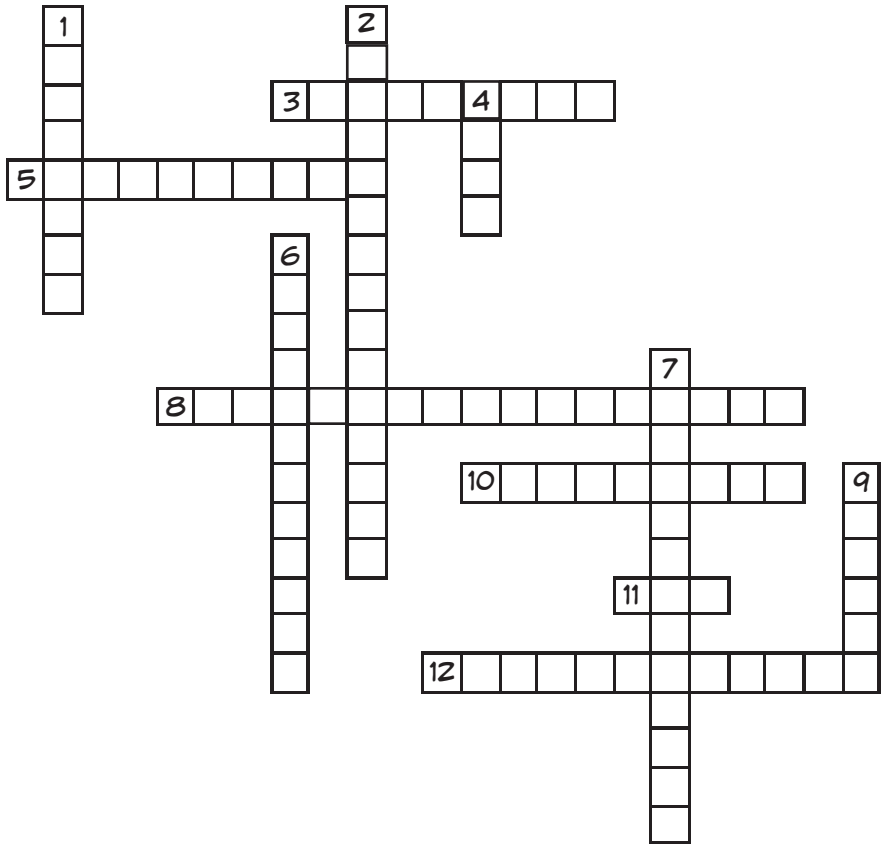
The stratosphere is where the good ozone is located. The stratosphere protects life on earth by absorbing some of the sun's UV rays.

Stratospheric ozone is found between 6 to 30 miles above the earth's surface.

WHAT IS THE OZONE LAYER?



COMPLETE THE CROSSWORD BELOW



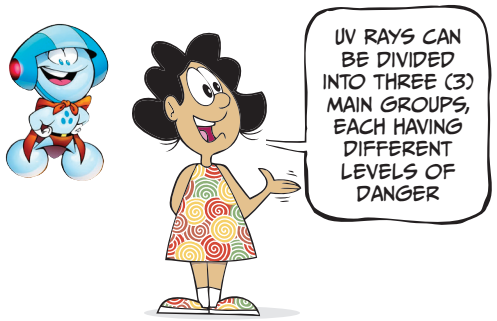
Down

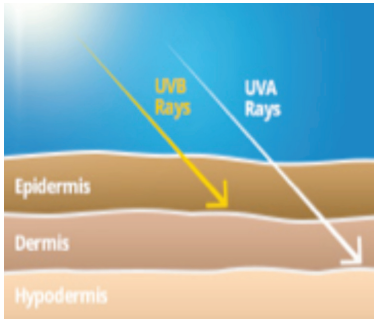
1. The female mascot representing the National Ozone Unit.
2. The breakdown of the ozone layer.
4. Type of refrigerant being phased out in SVG.
6. The part of the atmosphere where the ozone layer is located.
7. Three oxygen atoms bonded together.
9. Solar radiation that is harmful to us.

Across

3. A layer of gas surrounding the earth's surface
5. The male mascot representing the National Ozone Unit.
8. Treaty designed to protect the Ozone Layer
10. The reduction of refrigerants consumed and imported into the country
11. Abbreviation for ozone office in SVG.
12. Name for gases used in air-conditioners and refrigerators.

ABOUT UV - RAYS





UV – A:

These sun rays pass through the ozone layer, exposing us to large amounts of these rays. Although it has a low level of burn damage UV-A rays can lead to cancer.

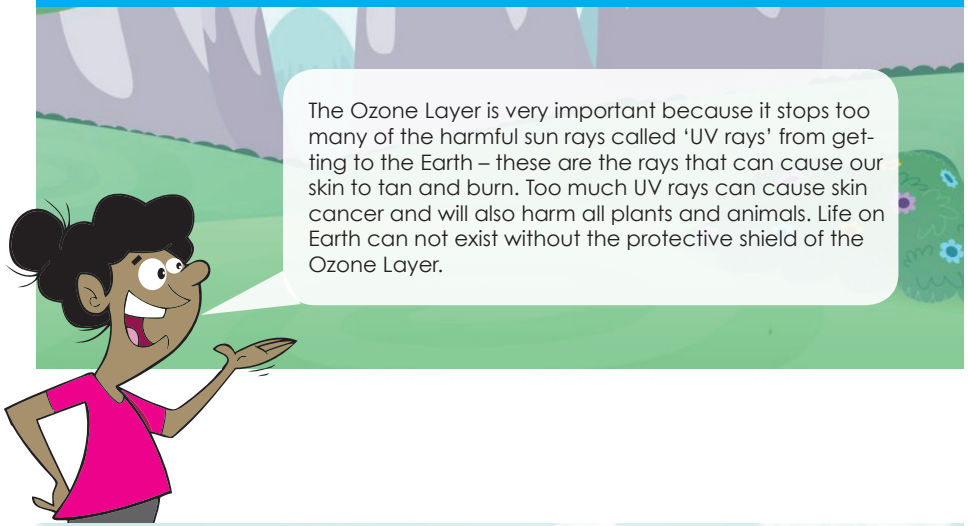
UV-B:

These sun rays are dangerous and can affect us. Most of these rays are absorbed by the ozone layer but because of human actions which deplete the ozone layer we are in danger of over exposure to UV B rays.

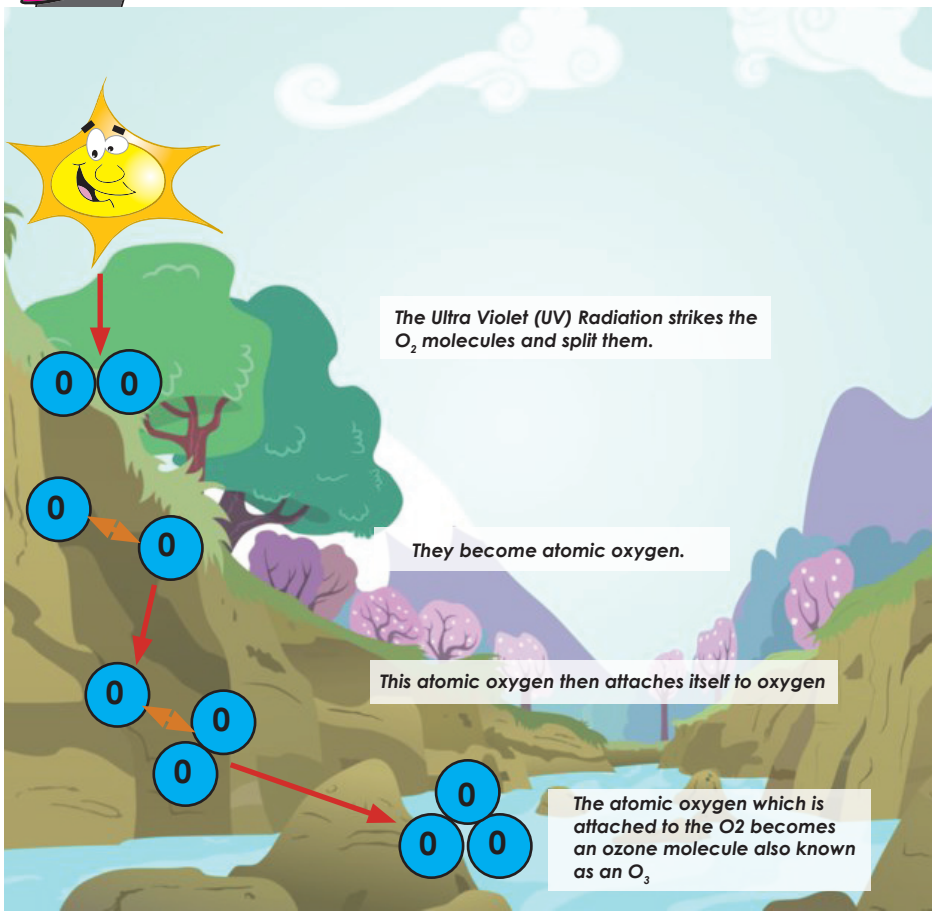
UV – C rays:

These sun rays are the most powerful, but fortunately they are stopped before reaching the earth's surface.

FUNCTIONS OF OUR OZONE LAYER & HOW IT IS FORMED



The Ozone Layer is very important because it stops too many of the harmful sun rays called 'UV rays' from getting to the Earth – these are the rays that can cause our skin to tan and burn. Too much UV rays can cause skin cancer and will also harm all plants and animals. Life on Earth can not exist without the protective shield of the Ozone Layer.



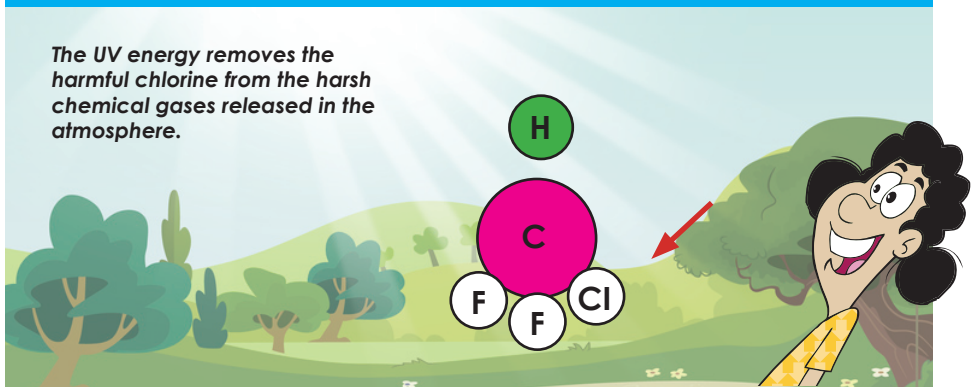
The Ultra Violet (UV) Radiation strikes the O_2 molecules and split them.

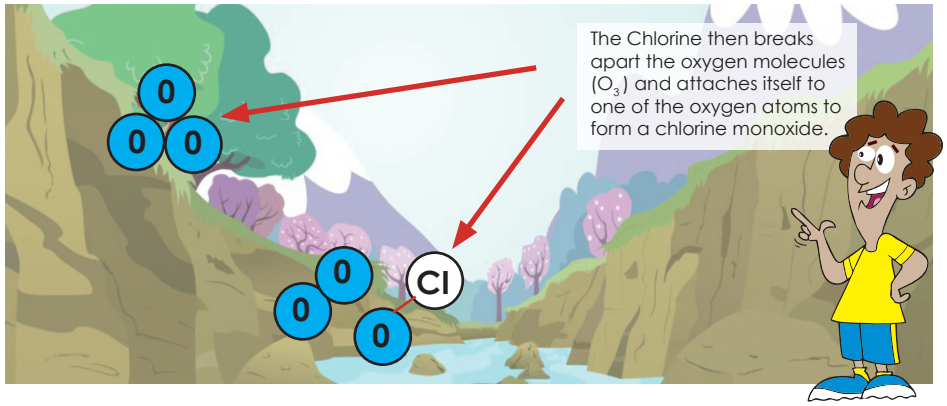
They become atomic oxygen.

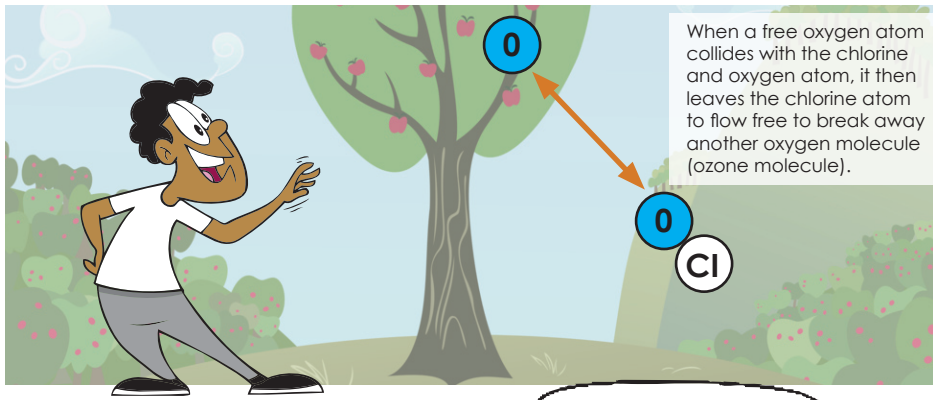
This atomic oxygen then attaches itself to oxygen

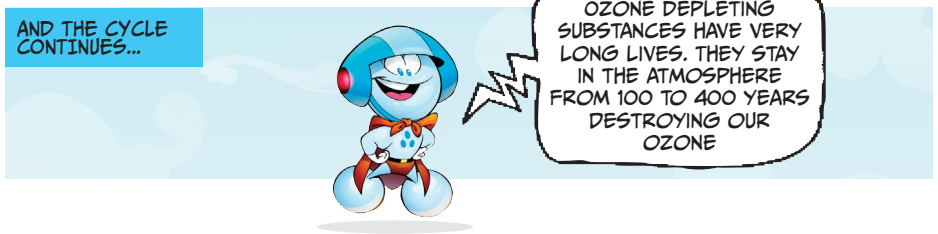
The atomic oxygen which is attached to the O2 becomes an ozone molecule also known as an O_3

HOW DOES THE OZONE LAYER GET DESTROYED?



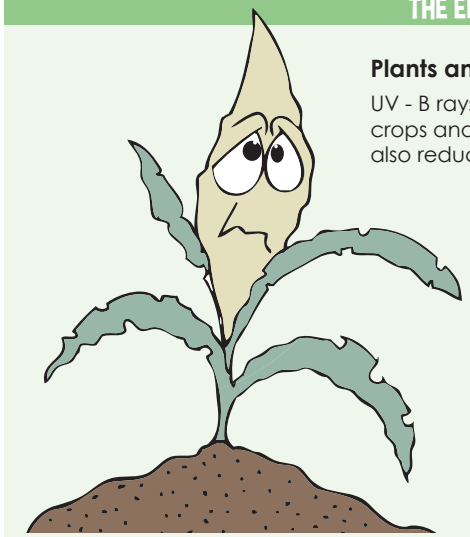






EFFECTS AND SOLUTIONS OF OZONE LAYER DEPLETION

THE EFFECT



Plants and Crops

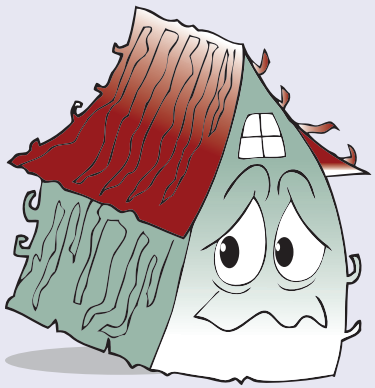
UV - B rays reduces the production and quality of crops and plants and causes damage to seeds. It also reduces the nutritional value of the crops.

THE SOLUTION

- Build greenhouses to shelter plants.
- Start a forest garden by growing crops under large trees to avoid them being hit with direct sunlight.

EFFECTS AND SOLUTIONS OF OZONE LAYER DEPLETION

THE EFFECT

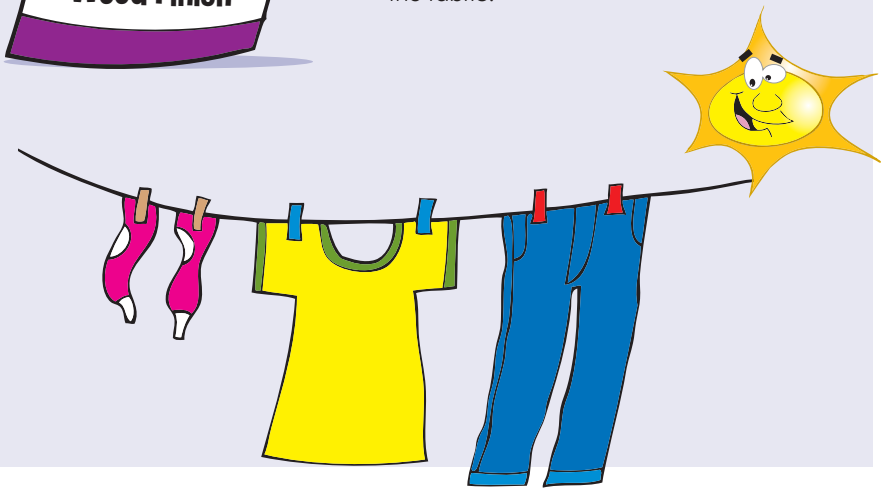


Materials

UV - B Rays quickly burn and bleach the colour and textures of materials such as wood, plastic and rubber especially in the tropical regions. These damages could be in billions of US dollars.

THE SOLUTION

- Protect materials like plastics by keeping them in a shaded area.
- Keep vehicles covered to protect the paint from fading and chipping away.
- Use UV-resistant paints for buildings and wood surfaces.
- Avoid direct sunlight when hanging out wet clothing. Sunlight will fade and destroy the fabric.

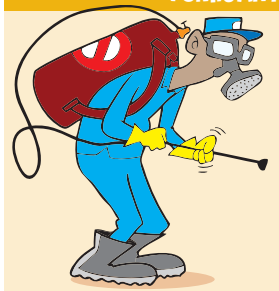


OZONE DEPLETING SUBSTANCES

PROPELLANTS FOR AEROSOLS

SUCH AS DEODORANTS, SHAVING FOAM, PERFUMES, WINDOW CLEANERS, LUBRICANTS, OILS, ASTHMA INHALERS, ETC.

FUMIGANTS



USED MOST OFTEN AS A PESTICIDE FOR SOIL FUMIGATION TO PROTECT CROPS.

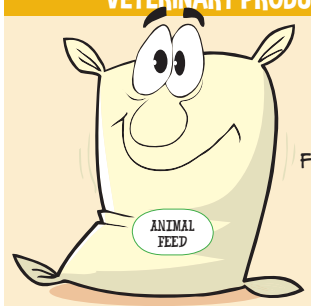
CLEANING SOLVENT

FOR ELECTRONIC ASSEMBLY PRODUCTION PROCESSES, PRECISION CLEANING & GENERAL METAL DEGREASING DURING MANUFACTURE, ALSO FOR DRY CLEANING & SPOT CLEANING IN THE TEXTILE INDUSTRY.

PHARMACEUTICAL PRODUCTS

USED FOR MEDICAL STERILIZATION.

VETERINARY PRODUCTS:

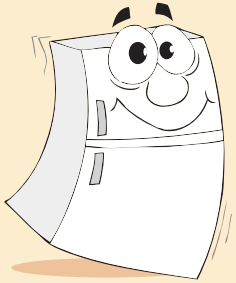


FEED STOCK

FIRE EXTINGUISHERS:

THOSE CONTAINING HALONS

REFRIGERANTS



REFRIGERANTS ARE COOLING AGENTS IN DOMESTIC, COMMERCIAL, INDUSTRIAL AND TRANSPORT OR MOBILE REFRIGERATION; MOBILE OR STATIONARY AIR-CONDITIONING SYSTEMS.

BLOWING AGENTS

FOR THE MANUFACTURE OF DIFFERENT TYPES OF FOAM PLASTICS

EFFECTS AND SOLUTIONS OF OZONE LAYER DEPLETION

THE EFFECT

Human Health

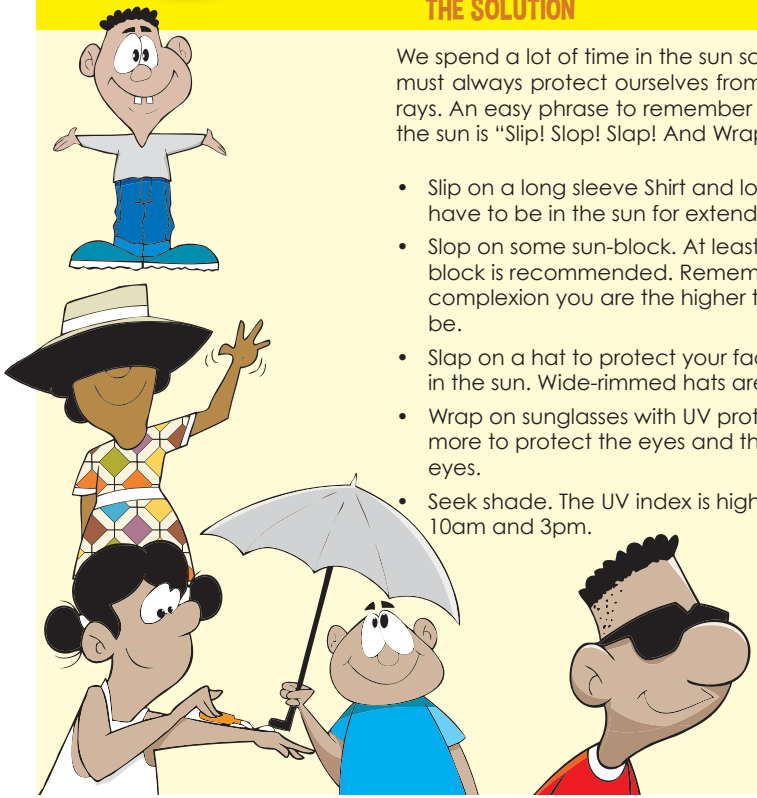
The sun can do way more damage than just give us sunburn. UV - B Rays are dangerous to our health as it weakens the immune system.

Too much sun exposure on our skin can cause us to suffer from:

- Skin cancers, sunburns and premature aging

UV – B radiation can cause us to suffer from eye diseases such as cataracts and blindness because it damages several parts of the eye, including the lens, cornea retina and conjunctiva. Cataract is a clouding of the lens and is a major cause of blindness in the world. A 10% thinning of the ozone layer can result in almost 2 million new cases of cataracts per year around the world.

THE SOLUTION

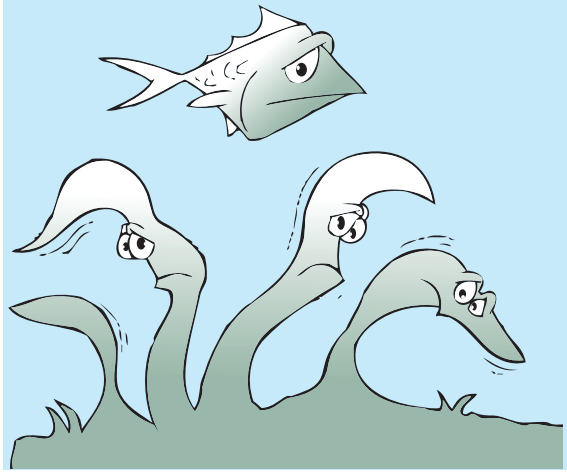


We spend a lot of time in the sun so for this reason we must always protect ourselves from the harmful UV-B rays. An easy phrase to remember when going out in the sun is "Slip! Slop! Slap! And Wrap!"

- Slip on a long sleeve Shirt and long Pants if you have to be in the sun for extended hours.
- Slop on some sun-block. At least a 30SPF sun-block is recommended. Remember the lighter in complexion you are the higher the SPF level should be.
- Slap on a hat to protect your face and neck while in the sun. Wide-rimmed hats are recommended.
- Wrap on sunglasses with UV protection of 98% or more to protect the eyes and the skin around the eyes.
- Seek shade. The UV index is highest between 10am and 3pm.

EFFECTS AND SOLUTIONS OF OZONE LAYER DEPLETION

THE EFFECT



Aquatic and Marine Life

UV – B Rays damage shrimp, fish larvae, amphibians and other sea life such as coral reefs in their early stages of development which causes a reduction in the fish population and reduces the food supply of bigger fish, thus, affecting the fishing industry negatively.

THE SOLUTION

There are many things you can do to help protect the ozone layer and the aquatic and marine life. Such as:

1. Encourage your family and friends to dispose of old fridges, vehicles and air-conditioners correctly. This means contact the National Ozone Unit to have the harmful refrigerant carefully removed from these machines before transporting it to the dump site.

2. If you are repairing an appliance or equipment containing Ozone Depleting Substances (ODS), contact a certified technician trained in the Good Refrigeration Practices of the Montreal Protocol to ensure that the refrigerant in your appliance or equipment is recovered correctly.