

THE OZONE LAYER

WHAT'S GOING ON UP THERE?

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A GIANT UMBRELLA OVER THE EARTH

You have probably heard people talk about a "hole" in our ozone layer. Damage to our Earth's giant protective umbrella is more severe in the South Pole, but, even there, no actual "hole" exists. And only a slight thinning occurs over the rest of the world. So no matter where you stand, you won't find a true "hole".

About 20 kilometres thick, this giant umbrella is made up of a layer of ozone gas. This gas is found some 15 to 35 kilometres above the Earth's surface in the upper atmosphere or "stratosphere".

Did You Know?

If the ozone layer were brought down to the Earth's surface, air pressure and temperature conditions would compress the ozone into a layer 2 to 5 mm thick!

Like a good pair of sunglasses, the ozone layer acts like a natural filter, blocking out most of the sun's harmful UV (ultraviolet) rays. Without the ozone layer, more people would get sunburns, skin cancer and cataracts. Plants and animals would also be affected. So we can think of the ozone layer as our planet's own protective sunscreen.

Fact:

Ozone (O_3) has three atoms of oxygen. The form of oxygen we breathe (O_2) has two oxygen atoms.

Sniff, sniff

If you have ever noticed the "sharp" clean smell after a thunderstorm or the "electric" smell of a subway train, then you've smelled a bit of ozone gas. In larger amounts, ozone is unpleasant with a strong odour that irritates the eyes and lungs.

Good and Bad Ozone

The ozone layer contains almost all the ozone gas that exists. This is "good" ozone because it protects us from the sun's UV rays. At ground level we find "bad" ozone, as a result of emissions from car exhaust, for example. During the summer it causes smog in large cities.

Unfortunately, ground level ozone is increasing while stratospheric ozone decreases. We cannot move the lower ozone gas up to help the ozone layer. The best solution is to continue to reduce all sources of pollution affecting our atmosphere.

Important Scientific Discoveries!

In 1985, British scientists found an ozone "hole" or large thin area over the Antarctic. After this discovery, Canadian scientists looked for ozone thinning in the Arctic. They found that the ozone damage over the Arctic was much less severe than the damage over the South Pole and that there was little increased risk to people living in the far north.

Even though the ozone layer is an invisible shield, scientists have found a number of ways to measure it; one way is to use helium-filled balloons that carry measuring instruments into the atmosphere and transmit information back to Earth. Environment Canada has also invented a very sensitive instrument that takes ozone layer measurements from the ground.

Did You Know?

Our own astronaut, Steve Maclean, used a Canadian-made instrument on a recent U.S. space shuttle mission to measure the ozone layer from space!

What are CFCs?

CFCs and other ozone-depleting chemicals were first mass-produced in the 1950s for use as refrigerants, industrial solvents, cleaning fluids and agents in making foam products. In the late 1960s, they were widely used in spray cans. In 1980, Canada and other countries banned CFC use in aerosol sprays.

Fact:

Scientists have shown that certain chemicals are slowly eroding the ozone layer. The main culprits are CFCs (chlorofluorocarbons).

Although CFCs do not harm the environment near the ground, they slowly travel upwards to the ozone layer where they are broken down by UV light into chlorine atoms. Here, the chlorine atoms eat away at the ozone like pac-men.

Did You Know?

If all ozone-depleting chemicals were successfully phased out, the ozone layer would eventually heal itself.

What's being done?

Canada and nations from around the world have agreed to stop using CFCs by 1996. In Canada, governments are also starting programs to recycle and recover CFCs.

It takes time before ozone-depleting chemicals can be totally eliminated. First, industries must develop harmless ways to replace the CFCs we use for important purposes like refrigeration. Also, some countries do not have the means to use substitutes. So a special fund has been set up to help these nations use new chemicals and technology.

We can see that a thinning ozone layer is a global problem that will only be solved with the cooperation of every country in the world.

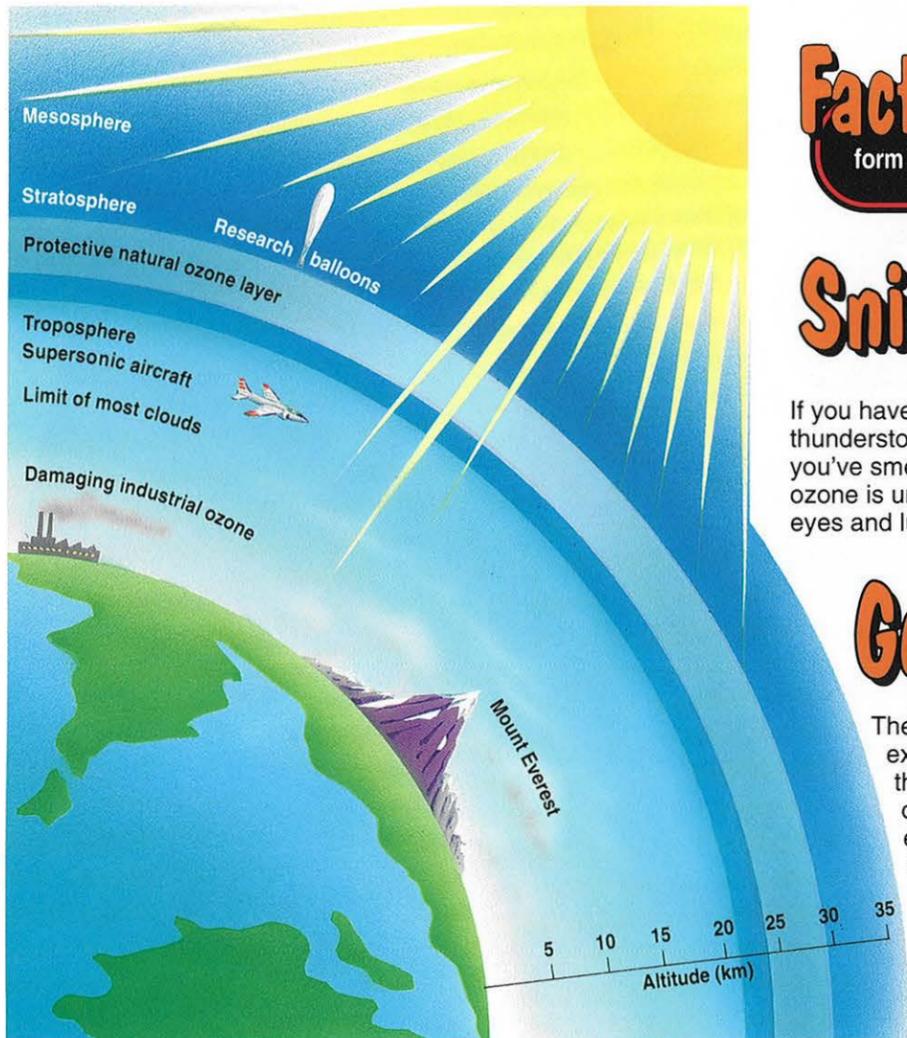
How can You help?

We have an important role to play in protecting the ozone layer. Together, we can take action by phasing CFCs and other ozone-depleting chemicals out of our lives.

In Canada, CFCs have been removed from spray cans and food packaging foam (egg cartons, foam cups, meat trays, etc.).

Until substitutes are found, CFCs will still be used in refrigeration. In the meantime, make sure your freezers and refrigerators are carefully serviced, and that CFCs are recovered and recycled rather than just replaced.

Avoid installing CFC-dependent air conditioning systems in your car. Use alternatives such as cardboard window screens to cool your parked car. If you have car air conditioning, make sure it is properly maintained and that the CFCs are recycled and recovered when serviced.



UV and You

The ozone layer screens out most of the sun's harmful UV (ultraviolet) rays. Our tans and sunburns are caused by UV. UV is a natural part of the sun's rays, but it has always been harmful.

With the thinning of the ozone layer, the amount of UV reaching us has slightly increased. This small increase doesn't mean we can't enjoy the outdoors, but we should always take precautions.

Fact:

We don't need a tan to be healthy. Protect your skin from the sun: Spend less time in the sun, especially when your shadow is shorter than you! Cover up! Wear a hat, long-sleeved shirt and long pants. Use a sunscreen SPF 15 or greater.

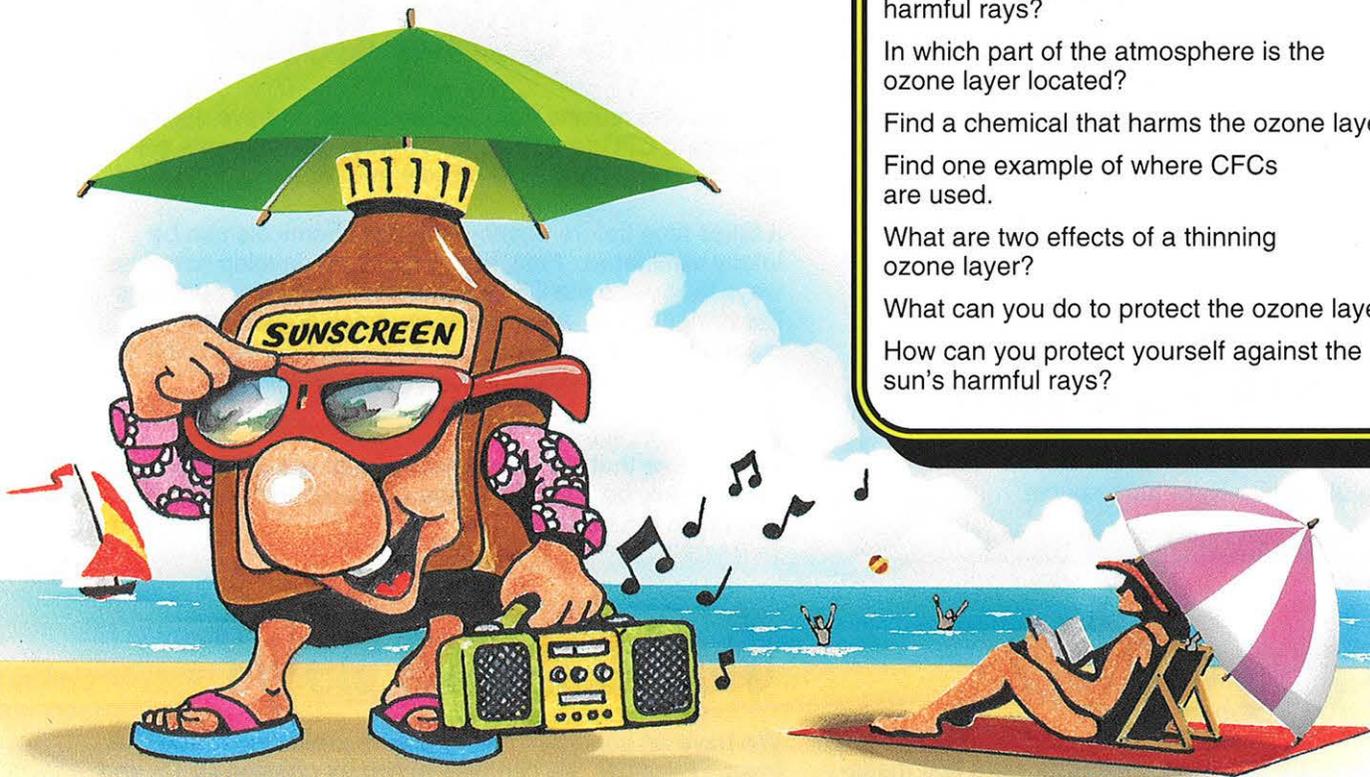
Tune in!

During the summer months, Environment Canada issues the UV Index as part of your daily weather forecast. Listen for it on the radio or TV, check the newspaper, or contact your local weather office.

Test Your knowledge!

- | | |
|--------------------|---------------------|
| a. Stratosphere | b. Refrigerators |
| c. Look for shade! | d. UV (ultraviolet) |
| e. CFCs | f. Recycle CFCs! |
| g. Crop damage | h. Sunburn |
| i. Ozone layer | |

- What do we call the Earth's giant protective umbrella?
- What is another name for the sun's harmful rays?
- In which part of the atmosphere is the ozone layer located?
- Find a chemical that harms the ozone layer.
- Find one example of where CFCs are used.
- What are two effects of a thinning ozone layer?
- What can you do to protect the ozone layer?
- How can you protect yourself against the sun's harmful rays?



Environmental Citizenship

Help protect the ozone layer!

Environmental Citizenship is an initiative of Canada's Green Plan. Its goal is a society where individuals and groups have the knowledge and understanding that will lead to responsible environmental action.

This fact sheet is one of a series of *Environmental Citizenship "Snapshots"* on atmospheric change. The objective of the series is to provide bias-balanced information and practical suggestions for taking action.

For more information, write or call the Environment Canada office nearest you, or:

Enquiry Centre
Environment Canada
Ottawa, Ontario
K1A 0H3

To find out more about how to protect yourself from the sun's rays, write to:

Health Canada
Publications Division
Communications Branch
Jeanne Mance Building
Ottawa, Ontario
K1A 0K9

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