

Springboard^{into} Comprehension 4

Main Idea Religions
Green All Around

Sequencing **Leading the Field in Green**

Camp Cavendish

Compare and Contrast Crying Wolf
Sun Tales

Fact and Opinion This Ad's for You
What Really Happened?

Cause and Effect Water and Food Programs around the World
Inventions and Discoveries That Changed the World

Bias and Prejudice Graffiti
Diamonds Forever

RA 9.5–10.5



Leading the Field in Green



Written by Jenny Baker

Leading the Field in Green

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Introduction

Who says one person cannot change the world? There are many people who have changed history. Scientists are often at the forefront of change. They ask questions. They discover new cures and technology. At times, they have to correct mistakes that other scientists have made. Scientists can make people more aware of some problems.

Mario Molina is a scientist who did research that helped the planet. He showed that some chemicals used in spray cans and refrigerators were very harmful. He proved that they destroyed a very important part of Earth's atmosphere. Because of his work, people became aware of the danger and were able to act.

Wangari Maathai is a scientist who showed people simple ways of helping themselves. She formed a movement that planted trees across Kenya. The trees improved people's lives. The movement expanded to help people across Africa.

James Barnard is a scientist who found out about wastewater. He found ways to make it safe for the environment before putting it back into rivers and the sea. His work helped other people make wastewater safe. Towns and cities all over the world now use his methods to make wastewater safe.

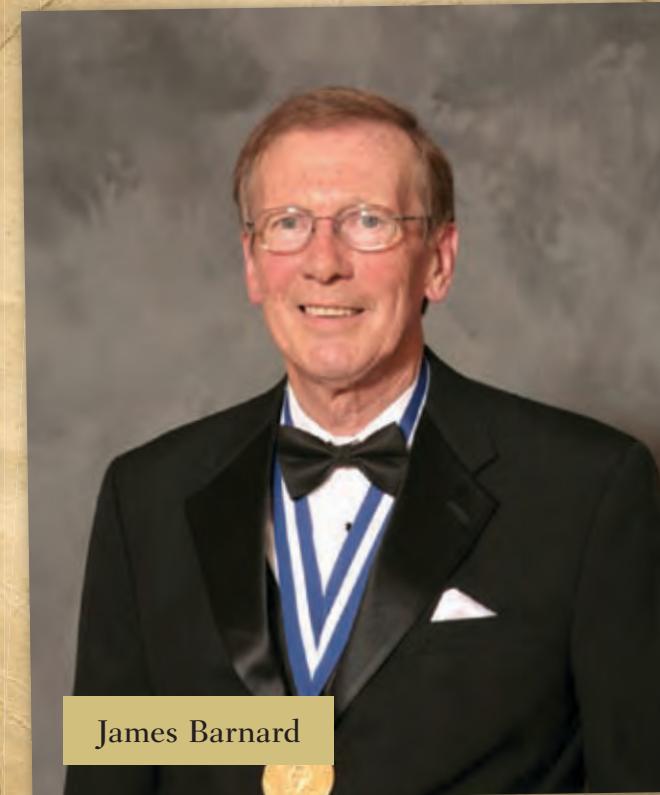
Mario Molina, Wangari Maathai, and James Barnard have helped change the world. Their work showed people better ways of doing things. They have helped people rethink what they were doing to the planet.



Mario Molina



Wangari Maathai



James Barnard

Mario Molina

Biography

Mario Molina was born in Mexico City, Mexico, in 1943. Even as a young child, he enjoyed science. He turned one of the rooms in his home into a laboratory. There, he played for hours with chemistry sets. His aunt was a chemist. She taught him to do difficult experiments. He liked it so much that he became a chemist, too.

Molina first studied in Mexico and Germany. Afterwards, he moved to the United States. In 1972, he received a doctorate in chemistry from the University of California. In 1973, Molina went to work for a researcher in California. His job was to test how chemicals called chlorofluorocarbons (CFCs) affect the environment.



Molina's hometown, Mexico City



Mario Molina's research on CFCs was very important.

The Science around CFCs

Scientists developed CFCs in the late 1920s. They wanted to replace very poisonous chemicals in refrigerators. They made CFCs from chlorine, fluoride, and carbon. People liked CFCs because they were cheap to produce. They could use them for many purposes.

By the 1970s, people were using CFCs in spray cans and refrigerators. At first, scientists thought CFCs were harmless because they were non-toxic. They thought CFCs would not damage the environment, so millions of tonnes of CFCs ended up in the air. They drifted up into the atmosphere.

High up in the atmosphere, the sun's energy is very strong. Some of this energy is light that cannot be seen by the human eye. This is called **UV light**. Too much UV light can be harmful to life on Earth. Fortunately, not all UV light reaches Earth's surface. The atmosphere partly protects people from UV light.

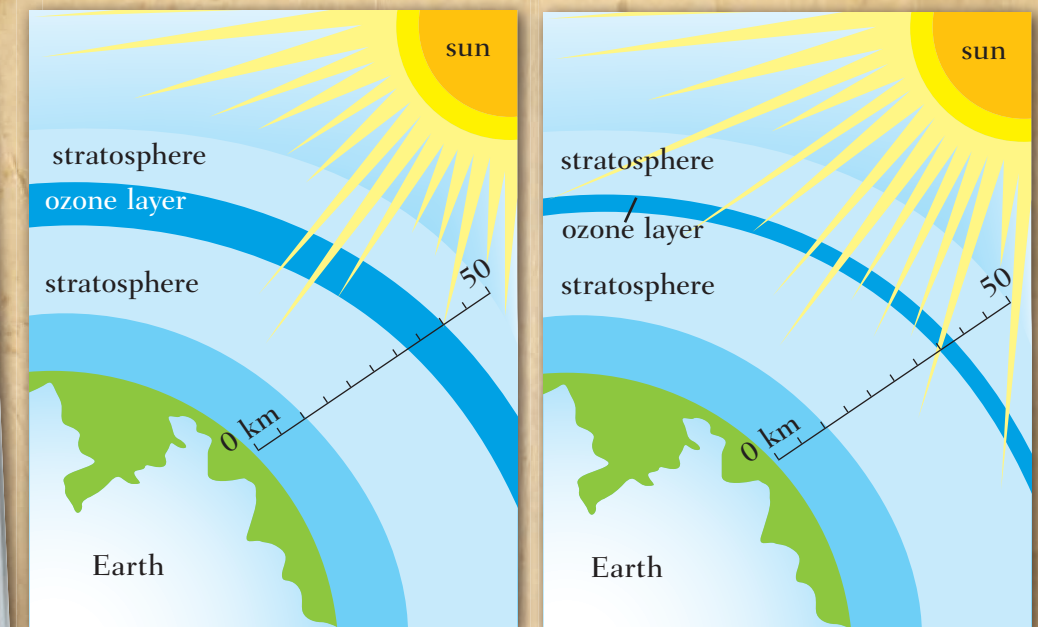
The part of the atmosphere between 10 and 50 km above Earth is called the **stratosphere**. In the stratosphere, there is a special layer of gas called the **ozone layer**. Ozone contains a special form of the gas that animals and plants need to live, oxygen. Ozone absorbs a large amount of harmful UV light.

Spray cans and refrigerators contained CFCs.

When the CFCs reach the ozone layer, the UV light breaks the chlorine part away. The chlorine then breaks up ozone. The ozone layer gets thinner. It cannot **absorb** as much UV light anymore. This means more harmful UV light reaches Earth.

Scientists have been **watching** the ozone layer for about 30 years. They have noticed that the ozone layer is getting very thin in parts. This is called the **ozone hole**. The size of the ozone hole changes over the year, but overall it is getting bigger. This has scientists very worried **because** too much UV light is harmful. It can cause skin cancer and eye disease. It can damage the small sea plants that many fish eat. It can harm the way land plants grow, too.

The Ozone Hole



The diagram on the left shows the normal ozone level. The diagram on the right shows the thinner level in the ozone hole.