
A Christian's Guide to Planet Earth

WHY IT MATTERS
AND HOW TO CARE FOR IT



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A Christian's Guide to Planet Earth

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Requests for information should be addressed to:
Zondervan, 3900 Sparks Dr. SE, Grand Rapids, Michigan 49546

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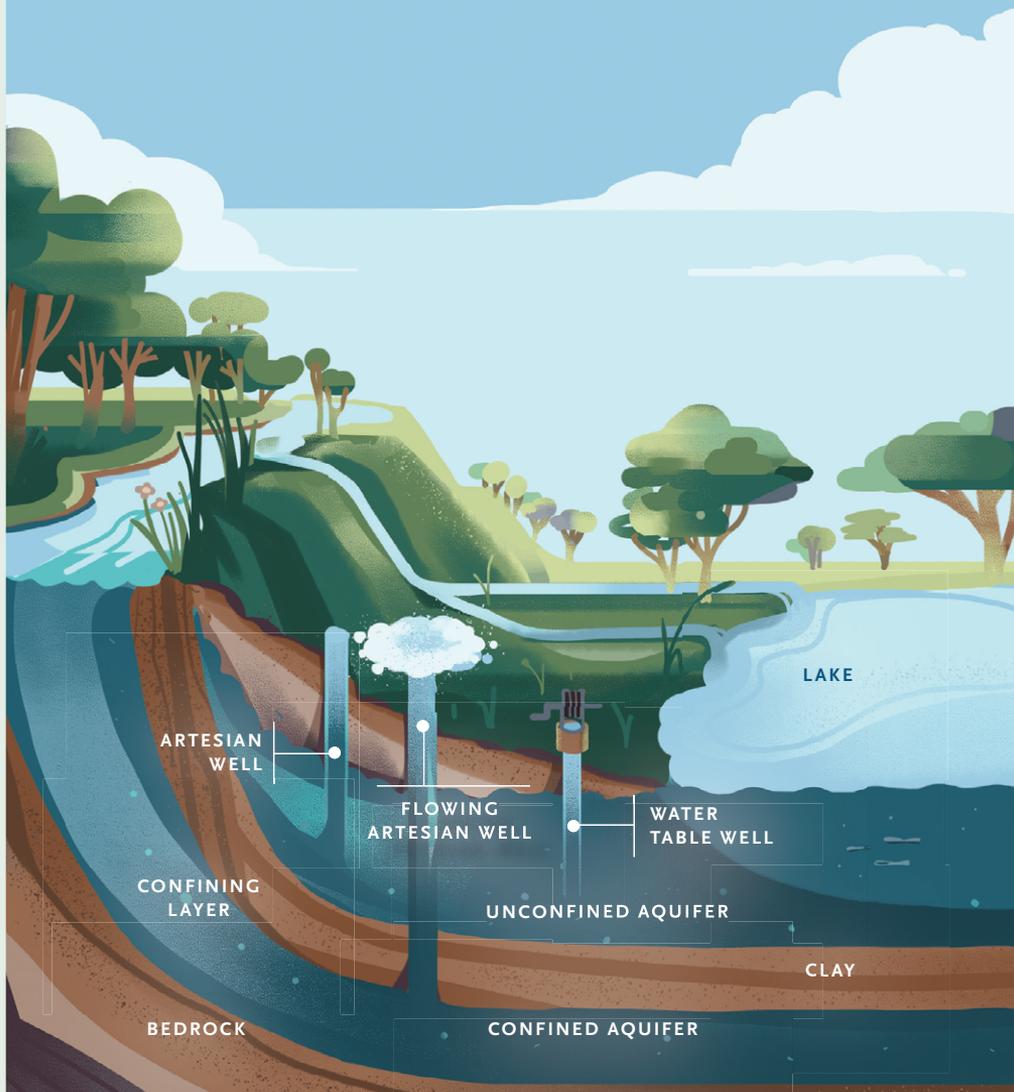
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Aquifers and Wells



Humans rely on aquifers for drinking water. These bodies allow water to move up through the saturated rock and sediment, providing the majority of our groundwater. These water-bearing strata release the water in appreciable amounts, which make up about 37 percent of our drinking water—noting that wells can be drilled into aquifers, for easier potable water access.



The Endangerment of Tigers

SCIENTIFIC NAME: *Panthera tigris*

The Sunda tiger once thrived across the Sunda islands of Indonesia, but now less than 400 remain on Sumatra, with the Bava and Javi tigers now extinct.

Tiger hunting began in the 1600s during big game safaris.

97% of the world's wild tiger population has been lost.

An estimated 3,900 individual tigers remain in the world as of 2021.

Tiger bones are in high demand for products like tiger wine and tiger paste.

Of the original 9 subspecies, 3 have become extinct in the last 80 years.

In Traditional Chinese Medicine (TCM), tiger parts are used for medicinal purposes.

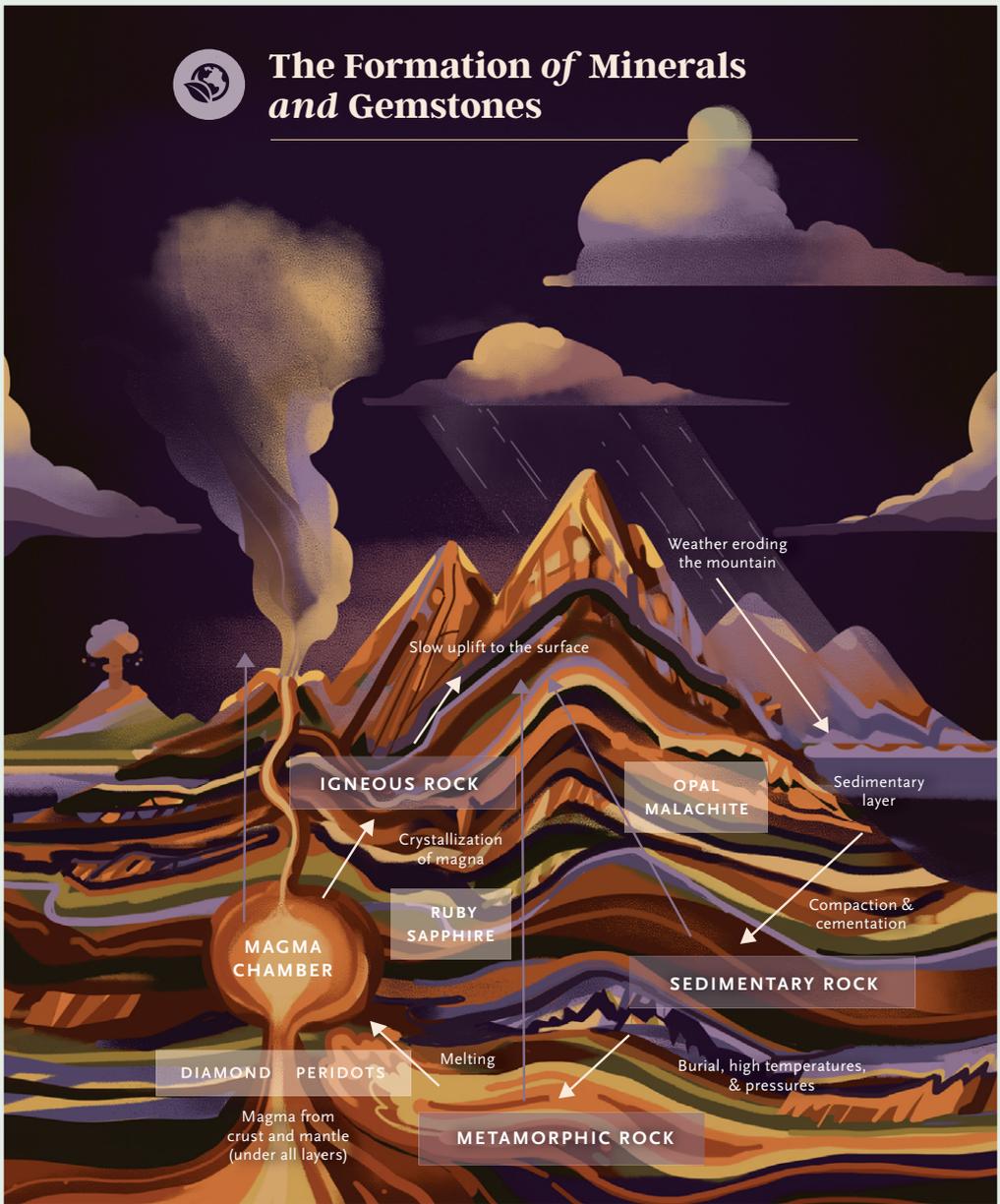
A century ago, more than 100,000 tigers roamed the earth.

The South China tiger is now considered functionally extinct, with zero sightings in the wild for decades.

Tigers have faced extinction since the 1970s, when their population dropped to fewer than four thousand remaining in the wild. Poaching, fragmentation, and habitat loss have led to their endangerment. Unless wildlife conservationists succeed at protecting both the animals and their habitats, it's estimated that tigers could become extinct in the next twenty years.



The Formation of Minerals and Gemstones



Minerals and gemstones form under various conditions in the earth's crust, with the exception of diamond and peridot, which form much deeper in the earth's mantle where magma is found. Through what's called the *igneous process*, magma rises through volcanic pipes to the crust and cools, crystallizing and forming minerals and a long list of precious gemstones.



Points of Air Pollution

CHEMICAL TRANSFORMATION

Ozone Destruction

Stratosphere

CHEMICAL TRANSFORMATION

Ozone Production

Troposphere

AIRCRAFT EMISSIONS

Long-range transport of aerosols and gases

Free Troposphere

CHEMICAL TRANSFORMATION

Deposition of pollutants

CLEAN OCEAN EVAPORATION

Boundary Layer

INDUSTRY

CITIES

TRANSPORTATION

Sulfur emission
from ships

FARMING

WILDFIRES

SHIPPING INDUSTRY

DESERT DUST

BIOMASS
BURNING

When solid and liquid particles—along with certain gases—become suspended in the air, they form air pollution. These gases and aerosols are created by everything from dust, pollen, and mold spores to car exhaust, factory farming, and wildfires. Most air pollution is caused by the burning of fossil fuels, transportation, agriculture, landfills, and exhaust from factories.



Elements of the Forest Carbon Cycle

CARBON DIOXIDE (CO₂)
IN ATMOSPHERE

COMBUSTION OF FUELS

DIFFUSION

Industry

Fossil fuels
(oil, gas, coal)

PHOTOSYNTHESIS

Plants

CELL RESPIRATION

Animals

DISSOLVED CO₂

BICARBONATES

CARBONATES
IN SEDIMENTS

DECOMPOSERS:

Fungi, earthworms, microbes

The carbon cycle is the biogeochemical process by which carbon is exchanged and is critical for maintaining a stable carbon balance and climate. It consists of these steps: carbon moves from the air to plants (in photosynthesis), from plants to animals, from plants and animals to soil (through decomposition), from living things and fossil fuels to the atmosphere, and from the atmosphere to the ocean.



Global Food Production and Waste

\$1 TRILLION DOLLARS' WORTH OF FOOD IS LOST OR WASTED EVERY YEAR.

IF EVEN 25% OF THE FOOD CURRENTLY LOST OR WASTED COULD BE SAVED, IT COULD EASILY FEED 870 MILLION HUNGRY PEOPLE IN THE WORLD.



UNITED STATES

In the United States alone, \$48.3 billion is thrown away each year. Overall losses are \$90–100 billion per year.



EUROPE

The food currently wasted in Europe—about 6.7 million tonnes—could feed 200 million people.



ASIA

In Asia, around 23 million tonnes of food cereals, 12 million tonnes of fruits, and 21 million tonnes of vegetables are lost each year.



LATIN AMERICA

In Latin America the food lost or wasted could feed 300 million people.



AFRICA

In Africa, losses can reach up to 50% for some less-hardy crops, such as fruits, vegetables, and root crops.



INDIA

An estimated 580 billion rupees (nearly \$8 billion) is wasted each year in India, in agricultural produce.



AUSTRALIA

In Australia, an estimated \$10.5 billion was spent on items thrown away (more than \$5,000 per capita per year).

An estimated 690 million people are hungry in the world—primarily in Asia and Africa—with the main problems being massive global food waste and poor distribution. A third of the food produced—around 1.3 billion tonnes—is either lost or wasted every year. About 35 percent are losses at the farm level, and another 26 percent are lost at the retail sector. Supermarkets, however, lost only about 1 percent.



The Importance of Pollinators



WHO ARE THE POLLINATORS?

Insects (such as ants, bees, butterflies, and flies), animals (such as birds, bats, reptiles, squirrels, rodents, and monkeys)—and even people.



ARE THERE OTHER WAYS TO POLLINATE?

Yes—wind often carries pollen and some flowers self-pollinate.



WHICH IS THE BIGGEST POLLINATOR?

Bees. They top the pollination success charts by far, and in 2010, honeybees contributed to 19 billion dollars in pollinated crops.



WHY ARE POLLINATORS IMPORTANT?

More than half of our food source depends on them.



WHAT KINDS OF FOOD RELY ON POLLINATION?

Most of our fruits (from apples to tomatoes), nuts and seeds (from almonds to sesame), spices and seasonings (from anise to vanilla), dairy products (our cows rely on pollinated alfalfa), and even coffee and chocolate!



HOW MANY PLANTS OVERALL RELY ON POLLINATION?

More than 75 percent of flowering plants rely on pollinators to reproduce.



HOW EXACTLY DOES POLLINATION WORK?

Insects and animals transfer the pollen from the male to the female parts of a flower—from stamen to pistil—to allow for reproduction.

Pollination is critical to our survival. Approximately 85 percent of all plants—more than 150 food crops in the US—depend on pollinators to produce seed, which are key to forming the next generation of plants. This, in turn, provides food for the next generation of pollinators and other life. Since the plants are rooted in place, pollinators act as the agent to transfer pollen for them.



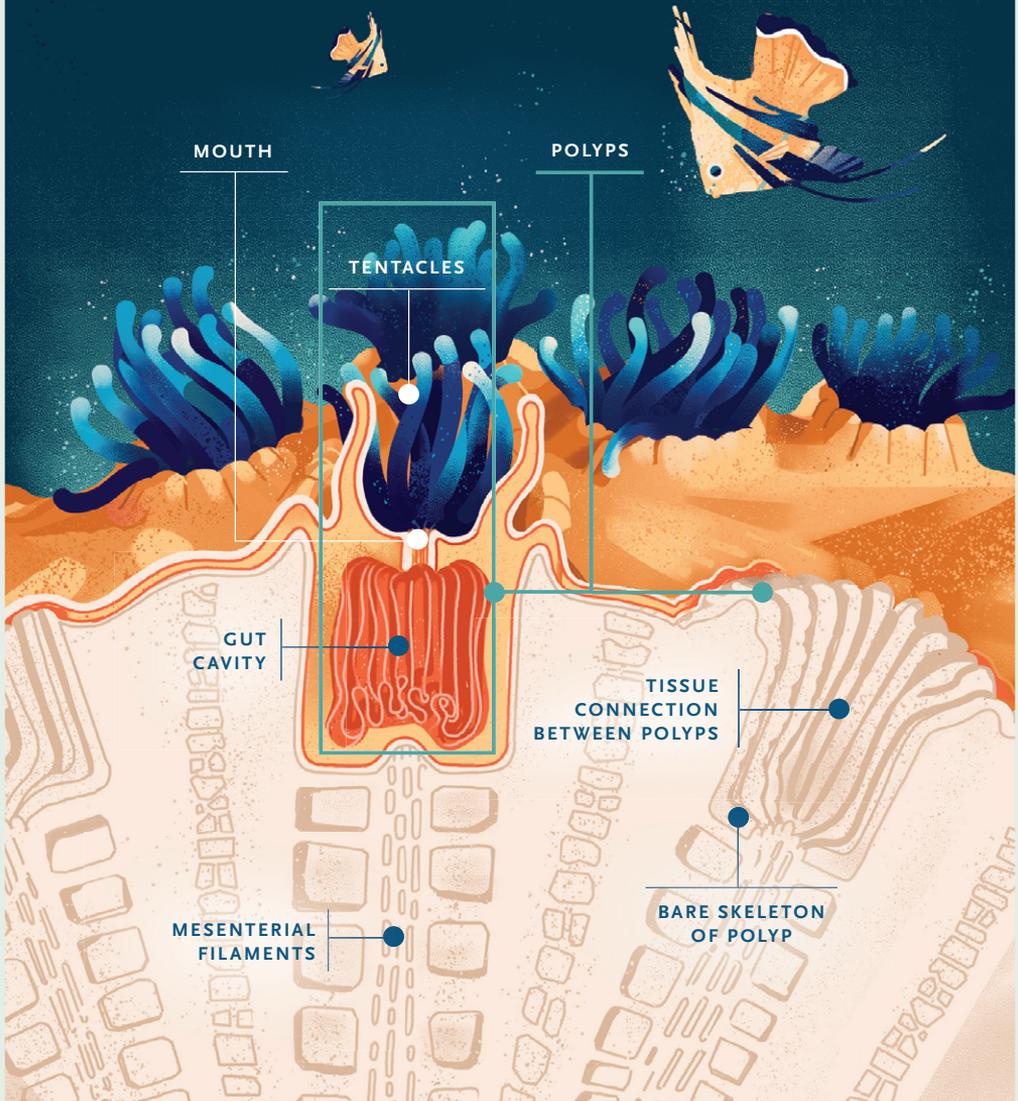
The Mangrove Ecosystem



Mangroves keep coastal zones healthy, providing habitat for thousands of species, stabilizing shorelines, preventing erosion, filtering pollution, including carbon dioxide, and protecting the land from waves and storms. They filter up to 90 percent of salt from seawater, and excrete it through glands and leaves, or through bark shedding. The destruction of mangroves in wetlands leads to coastal damage and increased flooding, along with the release of large amounts of carbon dioxide into the atmosphere.



Anatomy of a Coral



The coral reef structure is made of thousands of polyps. This illustration shows the basic anatomy of a single polyp—the main part of the structure affected by coral bleaching. Bleaching occurs when corals expel algae that live inside their tissue, causing them to fade, often turning completely white. When the ocean gets too warm, the coral becomes stressed and expels the vital algae.



Microplastics in the Ocean

INDUSTRY & POWER PLANTS

Source of pollutants

UV

BIOACCUMULATION

ADSORPTION

Contaminants & Toxins

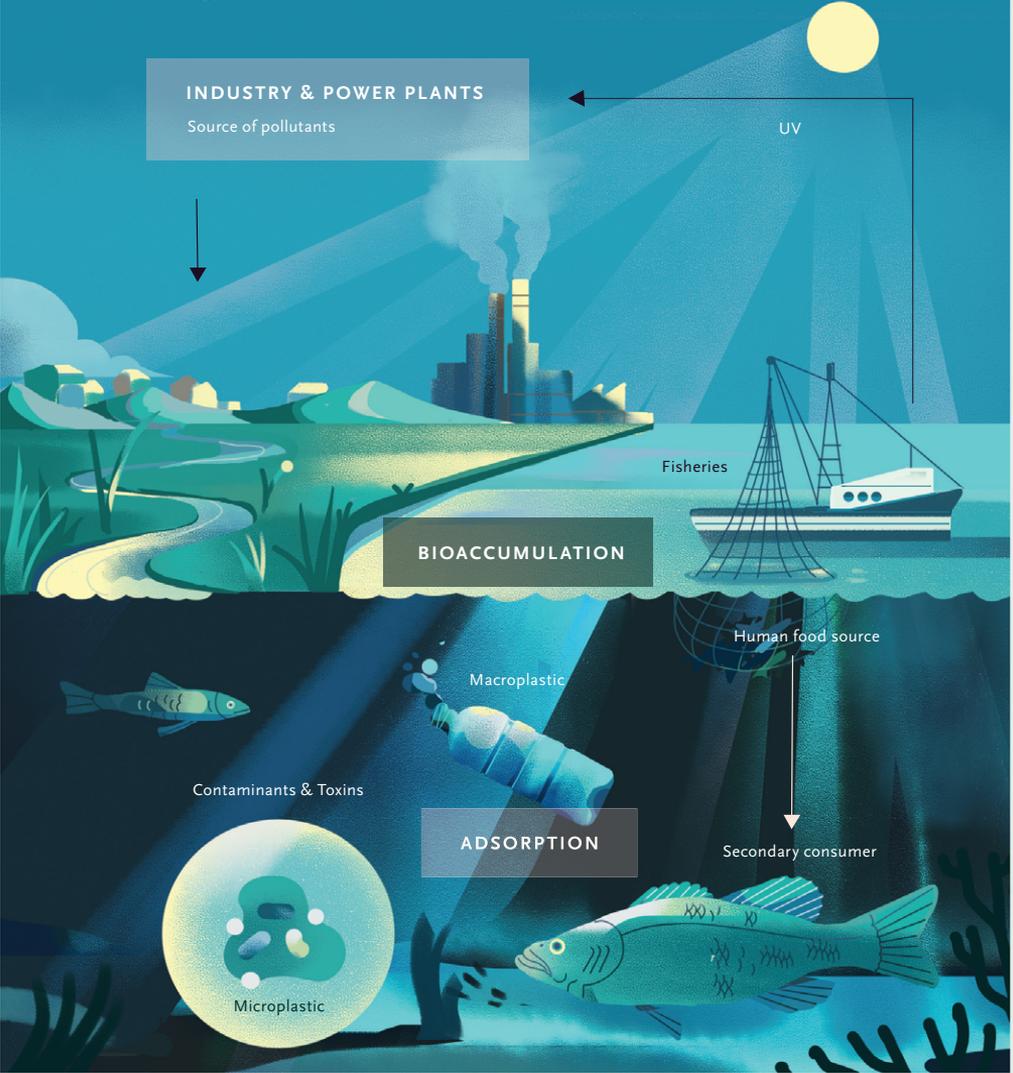
Microplastic

Macroplastic

Fisheries

Human food source

Secondary consumer



Microplastics—pieces smaller than 5 mm in size—are present in the oceans around the world. They're formed when larger pieces of plastic are broken down by waves, wind, and UV radiation from the sun. Through adsorption, contaminants and toxins bind to microplastics. Ingestion of these microplastics moves the chemicals up the food chain from plankton, to small fish, to larger fish and mammals, and then to humans—a process called bioaccumulation.



The Greenhouse Effect

NATURAL GREENHOUSE EFFECT

HUMAN GREENHOUSE EFFECT

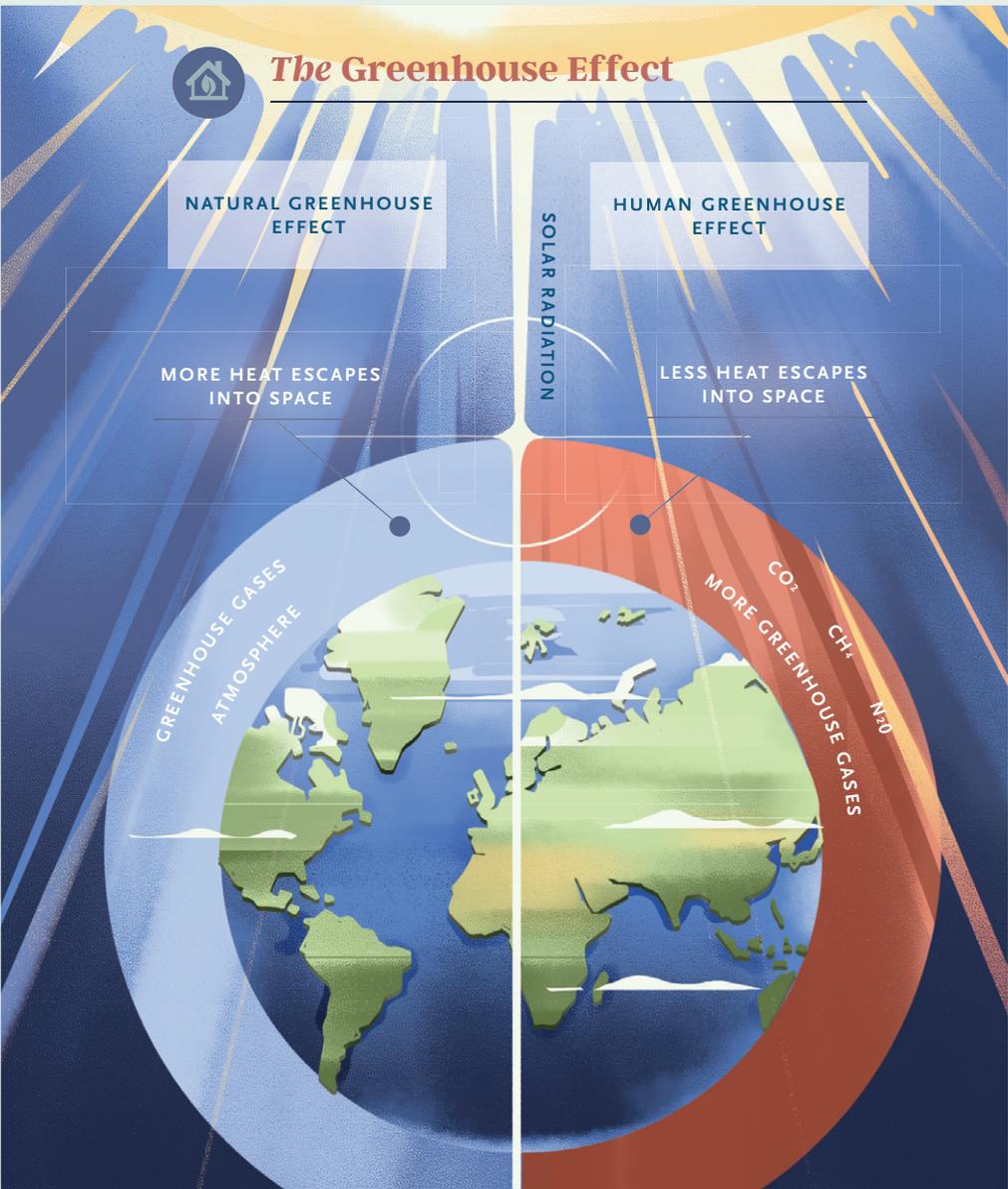
SOLAR RADIATION

MORE HEAT ESCAPES INTO SPACE

LESS HEAT ESCAPES INTO SPACE

GREENHOUSE GASES
ATMOSPHERE

CO₂
CH₄
N₂O
MORE GREENHOUSE GASES



The greenhouse effect is the natural warming of the earth's surface and atmosphere that results from the presence of carbon dioxide, methane, water vapor, and other gases or aerosols. Like a greenhouse, this radiating heat gets trapped in our atmosphere because certain gases allow sunlight to enter, while blocking the heat from escaping. Humans have augmented this greenhouse effect and interfered with the natural level of greenhouse gases in the atmosphere.