Climate Change - Global Warming

What Causes It

Though the temperature changes throughout the year, overall the Earth's temperatures are very stable. This is because we are surrounded by an atmosphere that lets just the right amount of sunlight in to warm the earth. It then blankets the Earth to keep the warmth from bouncing back out into space. About 90% of this heat is absorbed by the greenhouse gasses in the atmosphere – water vapor, carbon dioxide, methane, nitrous oxide and oxygen. They then radiate the heat back to Earth which keeps the planet warm enough to support life – not too hot in the summer and not too cold in the winter. Scientists call this the **greenhouse effect** because the atmosphere acts a bit like a greenhouse by keeping the right temperature for life to thrive on the planet.

Humans are now producing many greenhouse gases of our own (like carbon dioxide, methane, nitrous oxide, and ozone) by burning fossil fuels in our cars, homes and industry. Scientists have begun to worry that too many greenhouse gases are building up in our atmosphere. This could blanket the earth in an ever thicker atmosphere, blocking even more heat from escaping into space. Like a greenhouse with its windows shut on a hot, sunny day, it could make it get a lot hotter in here! This warming effect is called **global warming**.

Carbon dioxide is created naturally through plant and animal respiration, forest fires and volcanic eruptions. It is also increasingly being made by humans. Since the beginning of the Industrial Revolution (in the late 1700s) and at an increasing rate in the last century, humans have been burning fossil fuels (coal and oil) which also releases carbon dioxide (CO_2) into the atmosphere. So do other human actions, like deforestation and desertification. This increase in greenhouse gasses has had some startling effects on the natural communities on Earth. Scientists are calling this **Climate Change** or **Global Warming**.

How Does it Affect Us?

Global warming may warm the Earth by just a couple of degrees a decade, but over time this will add up. There is concern that this will melt the polar ice caps and raise the sea levels. Scientists at NASA can look at the Earth from space via satellites. They have noted that indeed the year-round ice pack in the Arctic is shrinking. In the past quarter century it has shrunk 10%. The largest ice shelf in the Arctic that had been in place for 3,000 years, broke up into the ocean in 2003. Climate does change naturally over time, but very sudden changes are unusual. These may be a sign of global warming.

If the ice caps do melt several things will happen. For one thing, the bright, white ice caps reflect a lot of the sun's energy back to space. As they disappear, more sunlight will be soaked up by the Earth. This will warm things up even more. Melting ice caps could change the ocean's saltiness (salinity) around the poles. This would affect the fish in the ocean. The melting ice caps would evaporate more easily adding more water to the water cycle. This could change weather patterns. New weather could change habitats around the world and all the animals that live in them. Already polar bears are struggling to survive when they need ice shelf off which they can hunt prey and they have all but melted. The result is polar bears starving and drowning.

What Has Been Done to Fix It

Countries around the world are attempting to lower their carbon emissions to slow the build up of greenhouse gases and onset of global warming.

What Can You Do to Help

Drive less. If you can walk or ride your bike somewhere instead of driving, it would be worth doing. Use public transportation when you can. Don't waste energy. A lot of electricity in this country comes from coal fired plants and they are big carbon emission producers.

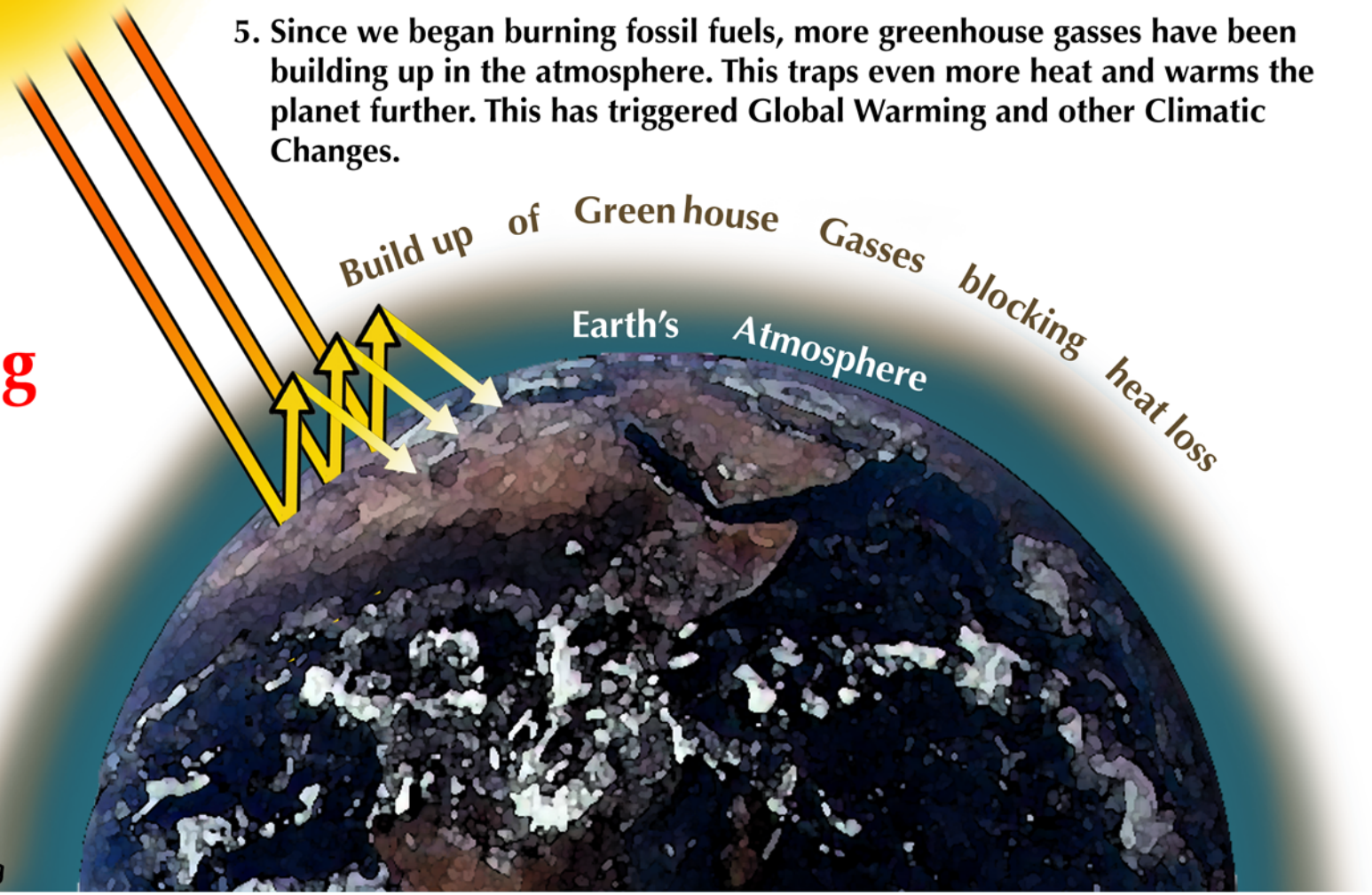
Global Warming

1. Sunlight makes its way to Earth through the atmosphere where it is absorbed. Heat is then released back up into the atmosphere.

3. Some heat is lost and some is absorbed by the atmosphere's greenhouse gasses (CO_2, methane, nitrous oxide, and water vapor).

4. It is then bounced back (re-radiated) to Earth, which warms the planet. This is called Greenhouse Effect and has been vital to life on Earth.

5. Since we began burning fossil fuels, more greenhouse gasses have been building up in the atmosphere. This traps even more heat and warms the planet further. This has triggered Global Warming and other Climatic Changes.



Global Warming

Essential Questions KEY

1. How does our atmosphere protect the Earth and what do we call this "Effect"?

2. How are we creating greenhouse gases of our own?

3. What happens to the atmosphere to cause global warming?

4. Name three things that could happen to the Earth if our ice caps melt?

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Climate Change

Greenhouse Gasses in the Atmosphere:

Water Vapor

CO2

Methane

Nitrous Oxide

Natural Sources of Greenhouse Gasses:

- Plant & Animal Respiration
- Volcanic Eruptions
- Forest Fires

Human Actions Increasing Greenhouse Gasses:

- Urbanization
- Deforestation
- Burning Fossil Fuels:
  - Automobiles
  - For Electricty
  - For Some Industry
- Agriculture:
  - Fertilizing Crops
  - Raising Livestock

Effects of Climate Change:

- Warmer Oceans
- Rising Oceans
- More Acidic Oceans
- Shrinking Glaciers
- Melting Arctic Sea Ice
- Rising Global Temps
- Melting Antarctic Sheet Ice
- Increasingly Severe U.S. Heat Waves