



Let's Make Molecules

Create your own greenhouse gas models!

Background Info

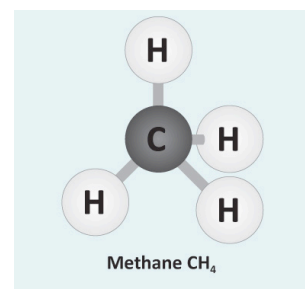
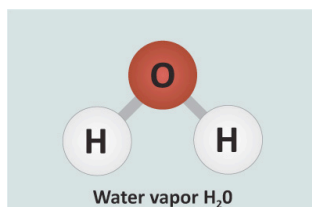
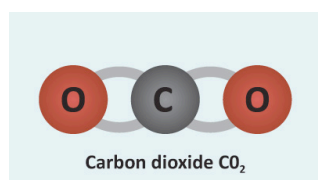
Carbon dioxide (CO₂) is the byproduct of burning **carbon-based fossil fuels** such as coal and oil. Once we use the heat from these energy sources, large amounts of carbon are released into the atmosphere; this carbon combines (bonds) with **oxygen atoms** to create **carbon dioxide**. As a result of our dependence on carbon based fossil fuels we have seen a significant increase in the amount of atmospheric carbon dioxide in the past hundred years. This increase in CO₂ is the primary cause of **global warming** and **climate change**.

Although carbon dioxide is the most common contributor to climate change, **water vapor (H₂O)** and **methane (CH₄)** are also important **greenhouse gases**. Greenhouse gases absorb and reflect back infrared energy, thus trapping heat within the Earth's atmosphere. The composition of the atmosphere is roughly 78% **nitrogen**, 20% **oxygen**, 1% argon, and a small amount of greenhouse gases.

The molecular structure of a greenhouse gas molecule is usually comprised of three or more atoms. This structure provides them with the ability to absorb infrared energy. By contrast, molecules that are comprised of the same two atoms each, such as molecular oxygen (O₂) or molecular hydrogen (H₂), do not absorb infrared energy and are not greenhouse gases.

CO₂ (carbon dioxide), H₂O (water vapor) and CH₄ (methane) are the chemical formulas that represent the molecules of greenhouse gases addressed in this activity. The chemical formula identifies each constituent element by its symbol and indicates the number of atoms of each element. To predict and understand the three-dimensional arrangement of the atoms that constitute molecules, scientist often build molecular structures.

The following figures are the molecular structures of CO₂, H₂O and CH₄, with atoms represented as circles and bonds between atoms as lines:



Credits

This project is made possible by a grant from the U.S. Institute of Museum and Library Services
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