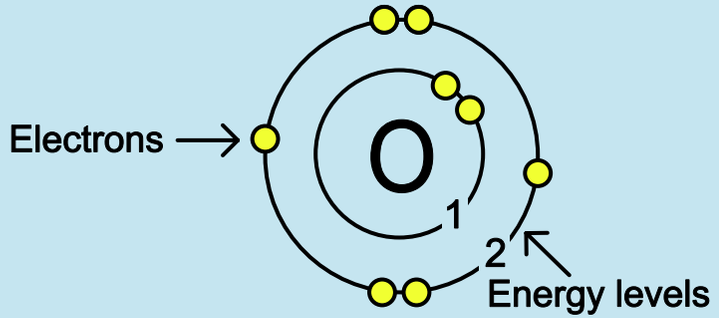
Oxygen ← Name of element
8 ← Atomic number of element
O ← Symbol of element
15.999 ← Average mass of atom of oxygen

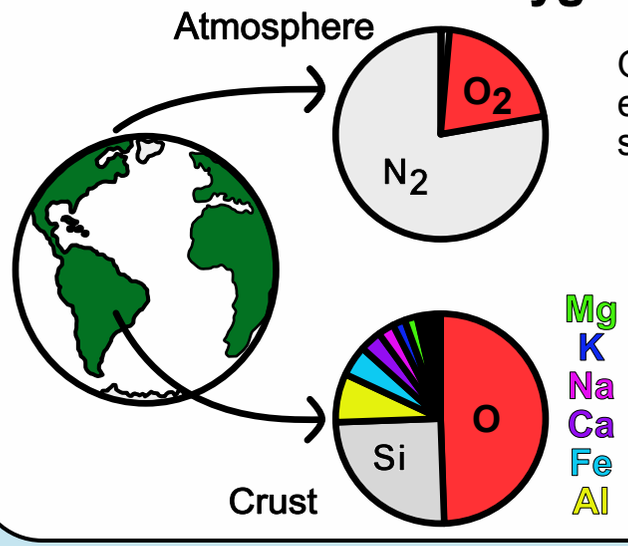
# Oxygen




## Discovery[1]

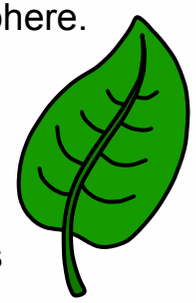
Joseph Priestly discovered oxygen gas in England in 1774. He found that both candles and mice would extinguish when in a sealed jar. He noticed that a plant in the jar would keep the flame and mouse alive.

## Oxygen on Earth[2]



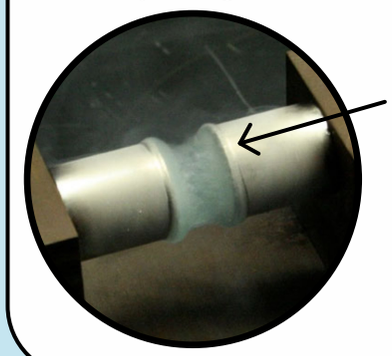

Oxygen is the most abundant element in Earth's crust, and second in the atmosphere.

All the oxygen you've ever breathed was produced by photosynthesis in plants and microscopic algae.



## Oxygen can be a cool molecule![3]

Cool oxygen down to -79 ºC, and it becomes pale blue. And it will also stick between the poles of a magnet because it is paramagnetic. This means in $O_2$ there are unpaired electrons. These electrons spin and act like tiny magnets.

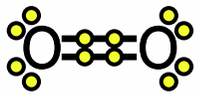


*Oxygen trapped between magnets[4]*

## Oxygen's octet[5]

***Filled octets:***
***Stable oxygen***

Molecular oxygen

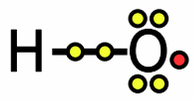


Many molecules are more stable when their atoms have "full octets" This means that the atoms have (or share) a total of 8 electrons in their outer energy level.

***Unfilled octets:***
***Reactive oxygen species***

Super oxide

Hydroxyl radical

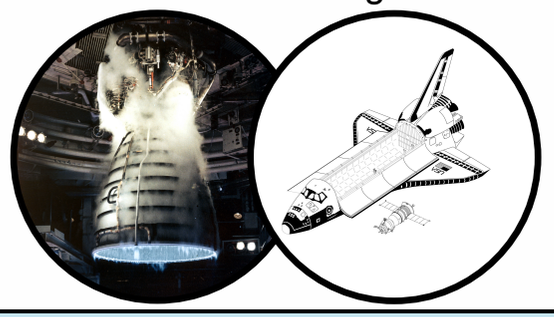


Molecules with unfilled octets allow cells to talk with each other and are important in the toxicity of many chemicals.

## Half of a clean fuel solution[6]

$$2\ H_2 + O_2 \rightarrow 2\ H_2O + \text{Energy}$$

Combining hydrogen and oxygen provides energy and water. This reaction has been used for years in space flight, and could be a clean alternative to burning fossil fuels.



*Infographic by Peter Clement, Center for Sustainable Nanotechnology. More info at: www.Sustainable-Nano.com*

1. *https://www.acs.org/content/acs/en/education/whatischemistry/landmarks/josephpriestleyoxygen.html;* 2. *https://www.ncbi.nlm.nih.gov/pmc/articles/PMC350422/;*
3. *https://chem.umn.edu/magnetic-properties-liquid-oxygen;* 4. *http://webmis.highland.cc.il.us/~jsullivan/principles-of-general-chemistry-v1.0/s13-03-delocalized-bonding-and-molecu.html;*
5. *https://www.biotek.com/resources/white-papers/an-introduction-to-reactive-oxygen-species-measurement-of-ros-in-cells/;* 6. *https://www.nasa.gov/mission_pages/shuttle/launch/LOX-LH2-storage.html*