

LESSON 15 – Attractions between molecules

NAME:

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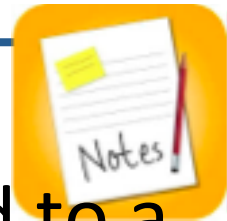
- Essential question: Why do some molecules smell while others do not?

Compounds that do not have a smell

We can smell some molecules but not others

Clean air or carbon dioxide does not have a smell

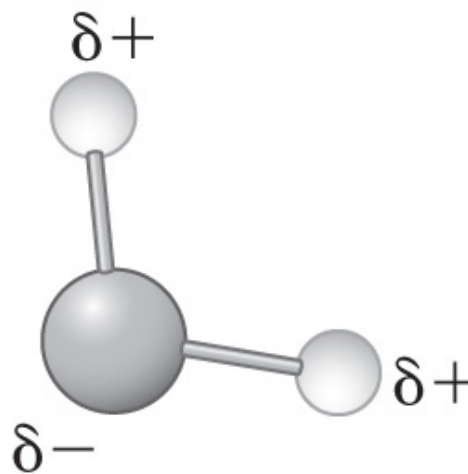
One of the properties involved in the smell of a molecule is polarity



- **Polar molecules:** Molecules that are attracted to a charge because they have partial charges on them.

- Water is an example for a polar molecule

One end of a polar molecule has a partial negative charge, and the other end of the molecule has a partial positive charge.





Partial charges in a molecule are much smaller than charges on an individual electron or proton. However, they are large enough to cause attractions such as between a charged wand and a stream of water.

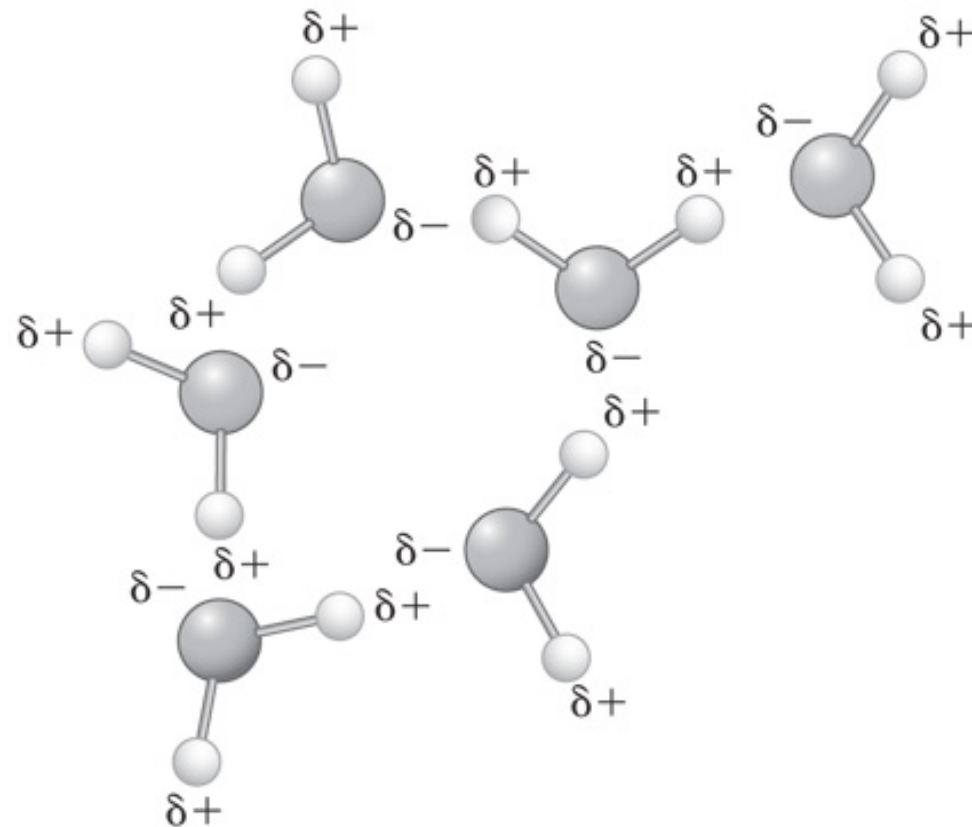
Nonpolar molecules: Molecules that are not attracted to a charge. They do not have any partial charge inside of the molecule.



- The individual molecules in polar liquids will respond when another charged substance comes near.
- Intermolecular forces:** The forces of attraction that occur between molecules.
- The partial charges on polar molecules cause individual molecules to be attracted to each other.



- In water, the partial positive charge of the hydrogen atom will be attracted to the partial negative charge of the oxygen atom of a neighboring water molecule





This also explains a typical behavior of water and other polar substances – they form droplets on a waxed surface

The molecules of the polar liquid interact with each other and “cling” to each other – forming a droplet rather than spreading out on the surface

- All molecules interact with each other, but the attractions between polar molecules tend to be stronger than those between nonpolar molecules.



Summary

- Why do some molecules smell while others do not?
 - Polar molecules have partial charges on parts of the molecule.
 - Polar molecules are attracted to a charge.
 - Polar molecules are attracted to each other. These intermolecular interactions account for many observable properties including smell
 - Nonpolar molecules might not be able to bind to smell receptors