



Unit 4: Chemical Reactions

Lesson 13: Polar Bears and Penguins

Guiding Question: Explain how polarity develops in bonds between atoms. How is a polar bond different from a polar molecule?

Do Now:

Answer these on the index card:

- 1) In your own words, what is the difference between polar and nonpolar?
- 2) Why does food coloring dissolve in water but not in vegetable oil?

Lesson #13- Polar Bear and Penguins

Purpose


To understand polarity and bonding between atoms.

Instructions

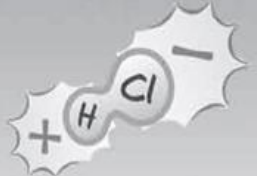
Read the comic strip “The Bare Essentials of Polarity,” and use it to answer these questions.

The BARE ESSENTIALS of POLARITY

You don't have to go to the ends of the earth to find polar molecules. They're all over the place. A polar molecule is just a molecule with a difference in electrical charge between two ends.




Polarity in molecules is caused by differences in electronegativity between atoms. Electronegativity describes the ability of an atom to attract bonding electrons toward itself.



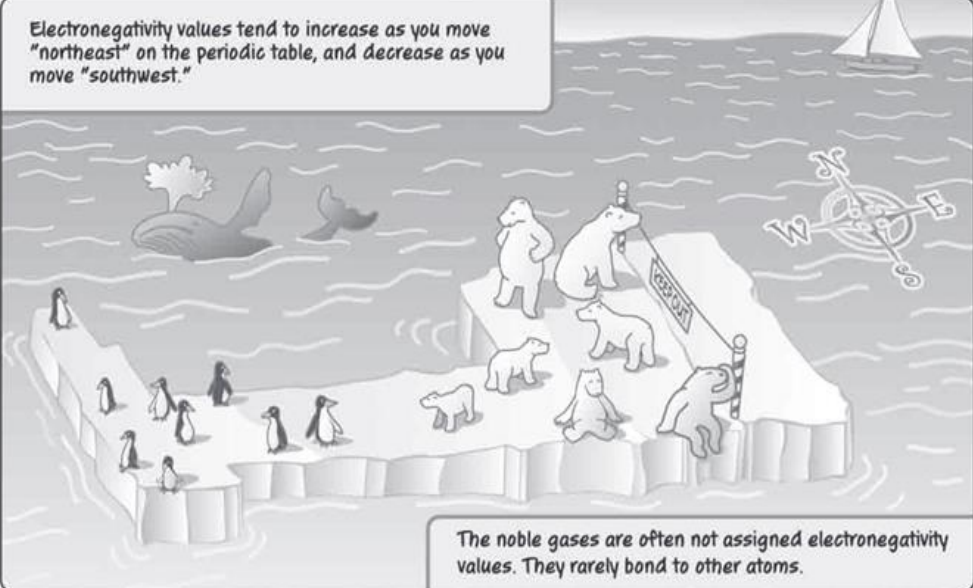
Bonded pair of electrons

HEY!

Chlorine is more electronegative than hydrogen. So the bonded pair of electrons in HCl spends more time near chlorine.



Electronegativity values tend to increase as you move "northeast" on the periodic table, and decrease as you move "southwest."



The noble gases are often not assigned electronegativity values. They rarely bond to other atoms.

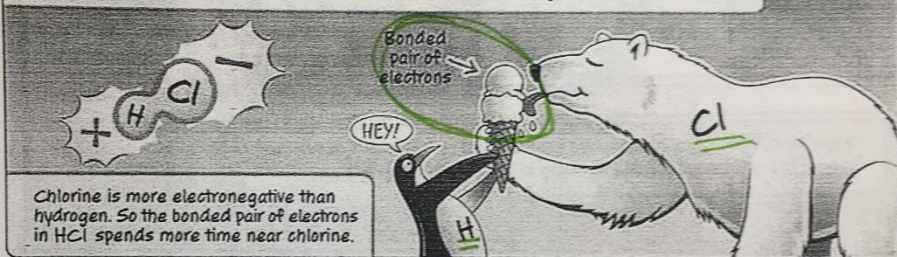
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The BARE ESSENTIALS of POLARITY

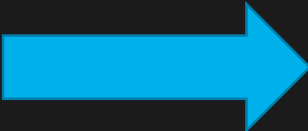
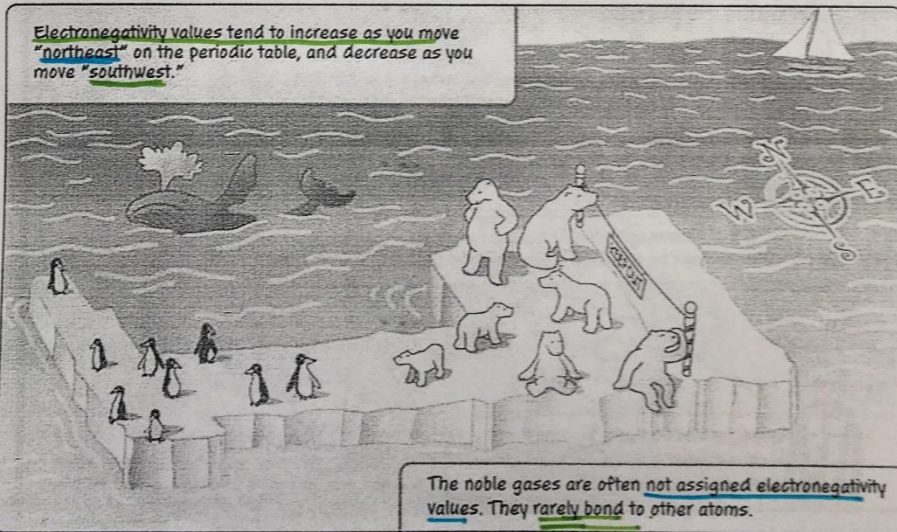
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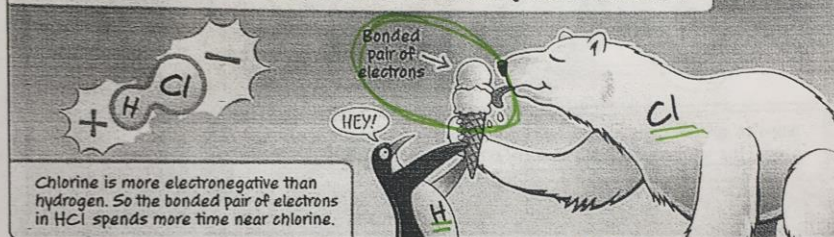
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The BARE ESSENTIALS of POLARITY

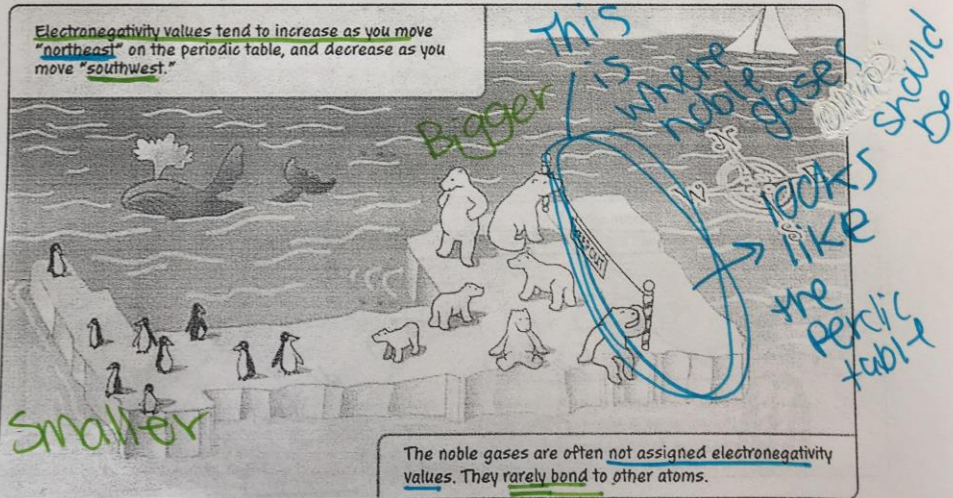
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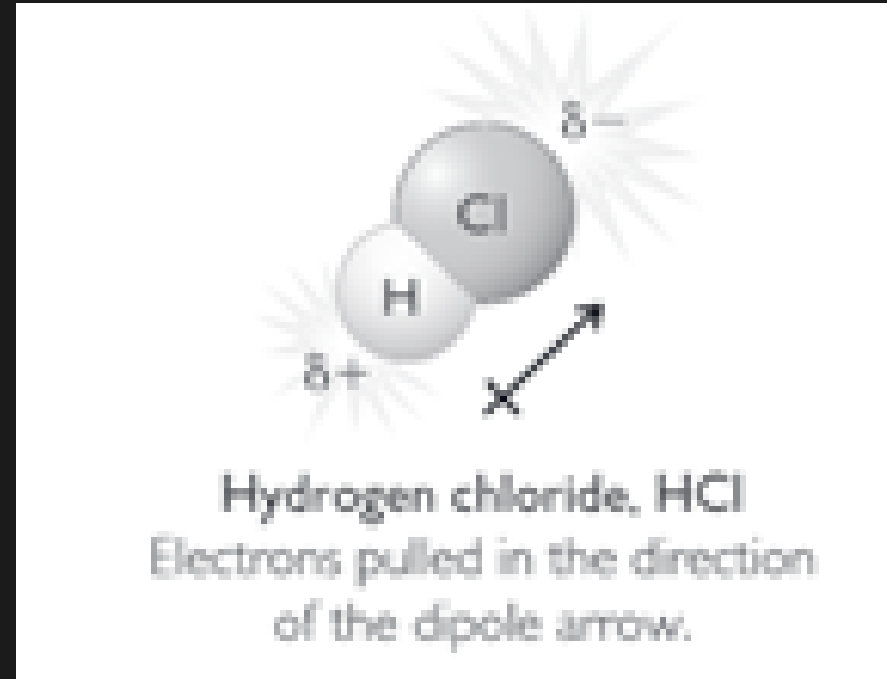
Notes (page 6)

Electronegativity is the tendency of an atom to attract a shared pair of electrons

- When two atoms with different electronegativities bond, they attract the bonding electrons to different degrees

Notes (page 6)

- The bonding electrons will spend more time around the more electronegative atom, resulting in partial negative charge on that atom
- The less electronegative atom will end up with a partial positive charge



Notes (page 6)

We use dipoles to show how electrons are distributed in an atom. A dipole points from the partial positive side of the bond to the partial negative side.

Bonds that involve transferring of electrons fall into three categories:

- Non polar: electrons shared equally
- Polar: electrons attracted to more electronegative atom
- Ionic: The difference in electronegativity is so great that the more electronegative atoms just takes the electrons from the less electronegative atom

Closure

- Answer Guiding Question on page 6.
- No homework this week (yay!)
 - We have a Performance Task and this will be part of your homework later this week.
- Achieve 3000: “The Missouri Gets a Makeover” due Friday, 3/23 at 11:59pm.