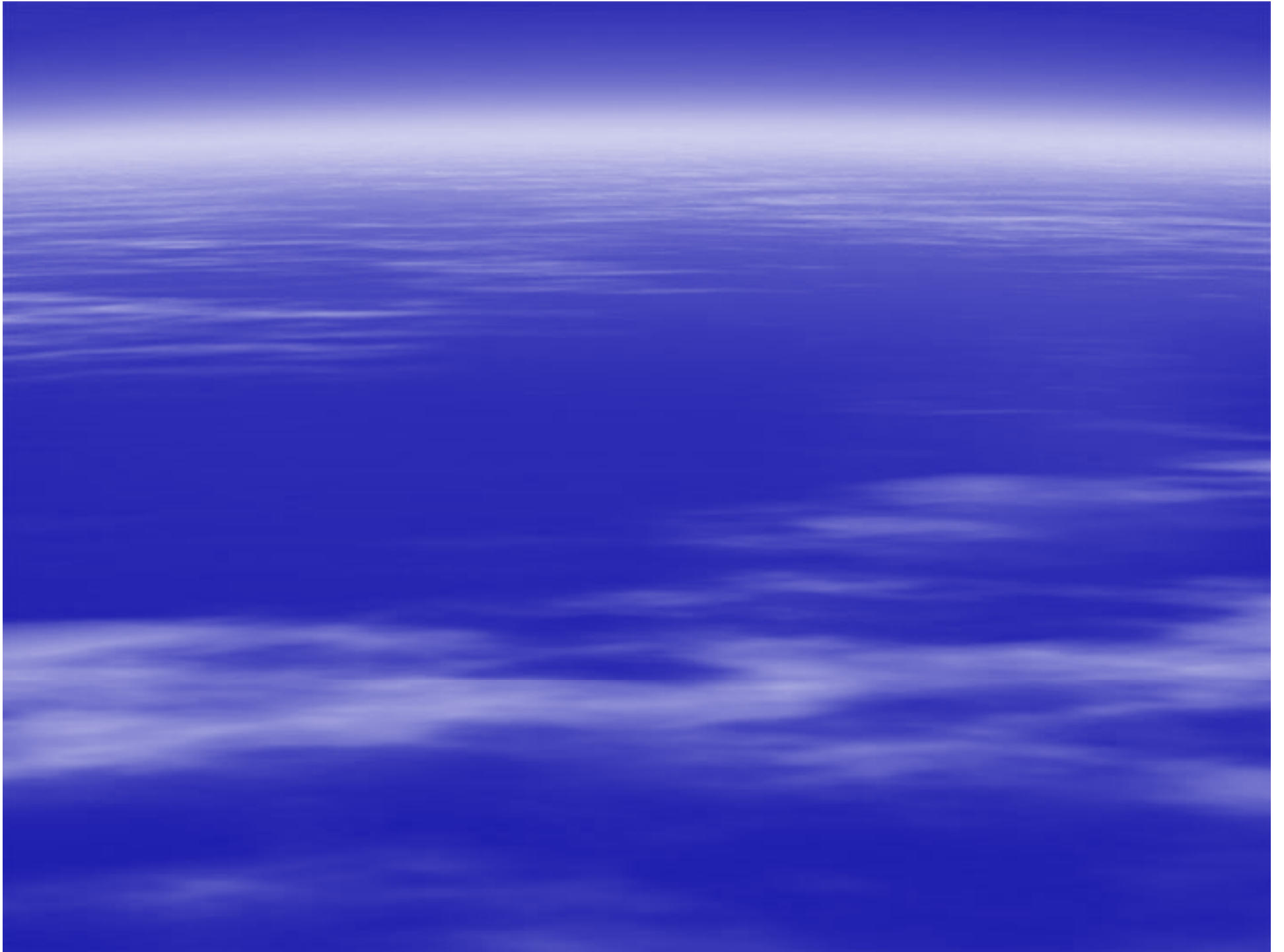


# Covalent bonding



# Single Covalent Bond

- A sharing of two valence electrons.
- Only nonmetals and Hydrogen.

# Covalent bonds

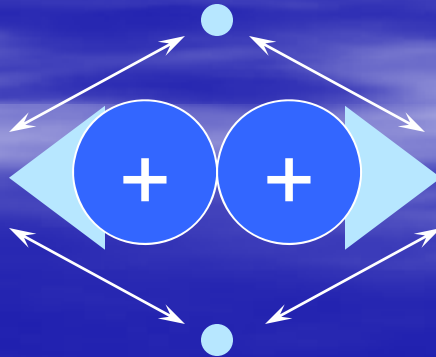
- Nonmetals hold onto their valence electrons.
- They can't give away electrons to bond.
- Still want noble gas configuration (full outer energy level).
- Get it by sharing valence electrons with each other.
- By sharing, both atoms get to count the electrons toward noble gas configuration.

# How does H<sub>2</sub> form?

The nuclei repel

But they are attracted to electrons

They share the electrons



# Electron Dot diagrams

- A way of keeping track of valence electrons.
- How to write them
  - 1) Write the symbol.
  - 2) Put one dot for each valence electron
  - 3) Don't pair up until they have to



# Electron Dot diagrams

- A way of keeping track of valence electrons.
- How to write them
  - 1) Write the symbol.
  - 2) Put one dot for each valence electron
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# The Electron Dot diagram for Nitrogen

- Nitrogen has 5 valence electrons.
- First we write the symbol.
- Then add 1 electron at a time to each side...
- Until they are forced to pair up.





# Your Turn to Try

- Fill in the chart on the bottom of page 26 in your packet.

# Electron Dot Notation

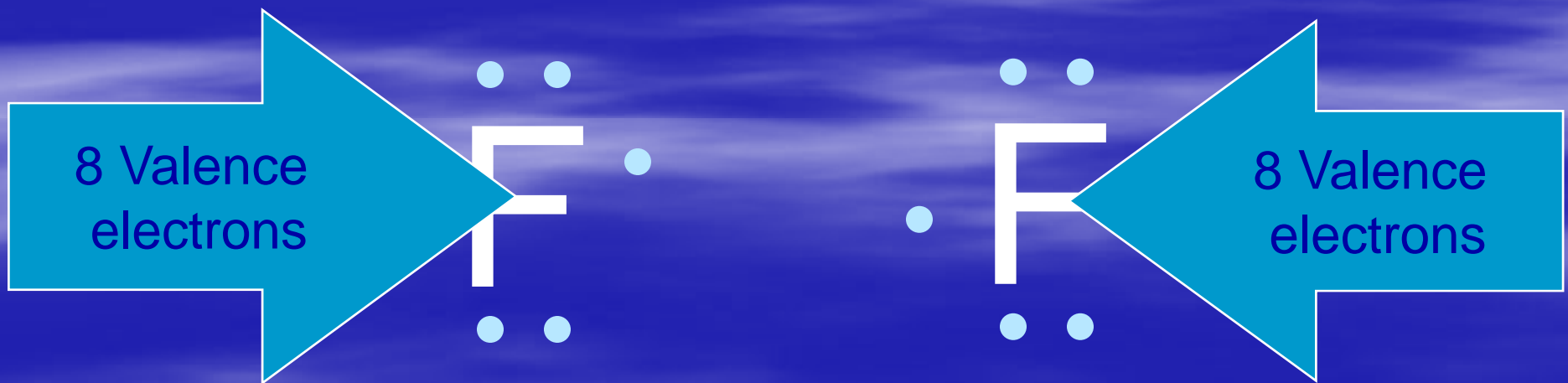
Element	Electron config.	Electron dot symbol
Li	[He]2s <sup>1</sup>	Li •
Be	[He]2s <sup>2</sup>	•Be•
B	[He]2s <sup>2</sup> 2p <sup>1</sup>	•B•
C	[He]2s <sup>2</sup> 2p <sup>2</sup>	•C•
N	[He]2s <sup>2</sup> 2p <sup>3</sup>	•N•
O	[He]2s <sup>2</sup> 2p <sup>4</sup>	•O•
F	[He]2s <sup>2</sup> 2p <sup>5</sup>	•F•
Ne	[He]2s <sup>2</sup> 2p <sup>6</sup>	•Ne•

# Covalent bonding

- Fluorine has seven valence electrons
- A second atom also has seven

By sharing electrons

...both end with full orbitals

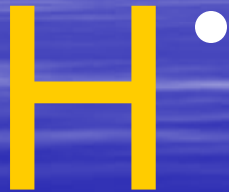


# How to show how they formed

- It's like a jigsaw puzzle.
- I have to tell you what the final formula is.
- You put the pieces together to end up with the right formula.
- Typically, the first element listed is the central atom....except if it is hydrogen!
- For example- show how water is formed with covalent bonds.



## Water



Each hydrogen has 1 valence electron and therefore wants 1 more electron (to have full outer shell like He)



The oxygen has 6 valence electrons and therefore wants 2 more (to have a full octet)

They share to make each other happy

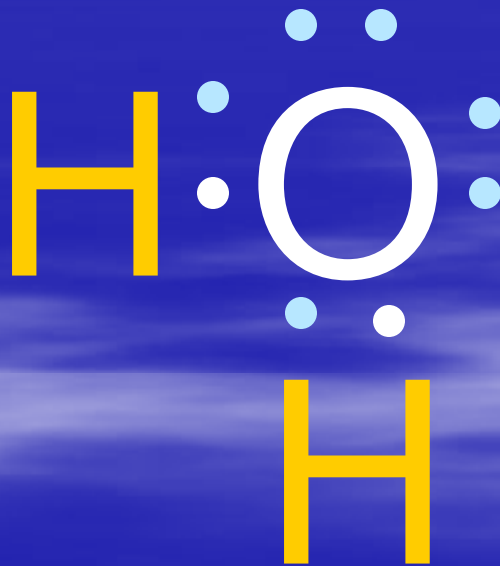
# Water

- Put the pieces together
- The first hydrogen is happy
- The oxygen still wants one more



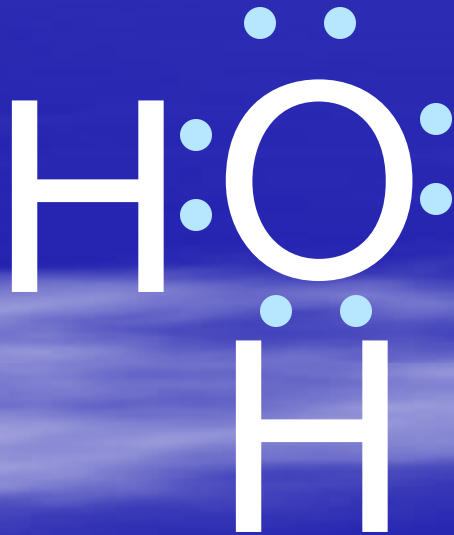
# Water

- The second hydrogen attaches
- Every atom has full energy levels



## Another way of indicating bonds

- Often use a line to indicate a bond
- Called a structural formula
- Each line is 2 valence electrons



OR

