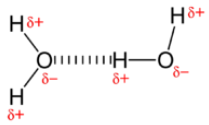
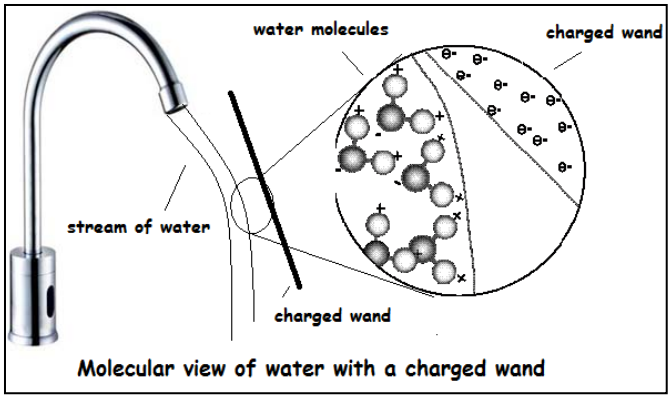


Name:_____ Per:_____

Molecular Attractions- "Are you attracted to me?"

Part I: "Bending" Water Demonstration

The image to the right shows an artist's rendition of the demo performed in class. Answer the following questions:



Molecular view of water with a charged wand

1. How did the ruler/ wand become negatively charged?

2. Why are the water molecules slightly charged?

3. Explain why water seemed to "move" towards the charged ruler/wand in the demo.

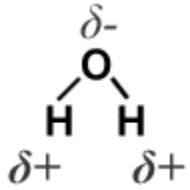
4. Do you think all liquids would behave this way next to a charged ruler/ wand? Explain.

Part II: Activity- How Molecules Interact with Each Other

Directions:

a. Look at your laminated cutouts and determine if each molecule is polar or non-polar. **If Polar**, mark the partial charges on each molecule with an expo marker (see H_2O example)

b. Start with the water molecule cut-out and then use the other laminated cut-outs provided to help determine how each molecule would align itself to a water molecule.



In the table below, sketch how each molecule would interact with a water molecule based on their polarity **(draw with correct shape & charge). NOTE: not all molecules may be polar**

a. $H_2O + H_2O$	b. $H_2O + HF$	c. $H_2O + HCl$	d. $H_2O + NH_3$	e. $H_2O + H_2S$
f. $H_2O + CF_4$	g. $H_2O + H_2CO$	h. $H_2O + CHF_3$	i. $H_2O + CH_4O$	j. $H_2O + NaCl$

Part III- Molecular Attractions and Smell

In trying to understand how our sense of smell works, scientists realized that molecular shape alone does not fully explain why certain molecules smell and others do not. Scientists believe that molecular interactions between the molecules that smell and the molecules that make up the receptor sites in the nose also are important in explaining how our sense of smell works.

Below is a chart showing some molecules that have a smell and some that have no smell. **Based on your Polarity worksheet, determine if each molecule is polar or nonpolar.**

Molecule	**N_2**	**PH_3**	**CH_4**	**H_2Se**	**NH_3**	**HBr**	**CO_2**	**AsH_3**
Has a smell?	No	Yes	No	Yes	Yes	Yes	No	Yes
Polar/Nonpolar?								

Questions:

1. Most of the molecules you combined with water in the "Molecular Attractions – Are You Attracted To Me" activity have a distinct smell, except one. Which molecule do think your nose is unable to smell? Explain why you chose that one.

2. a) What do all the molecules that smell have in common (in relationship to molecular geometry/ polarity)?

   b) What do all the molecules that are odorless (don't smell) have in common (in relationship to molecular geometry/ polarity)?

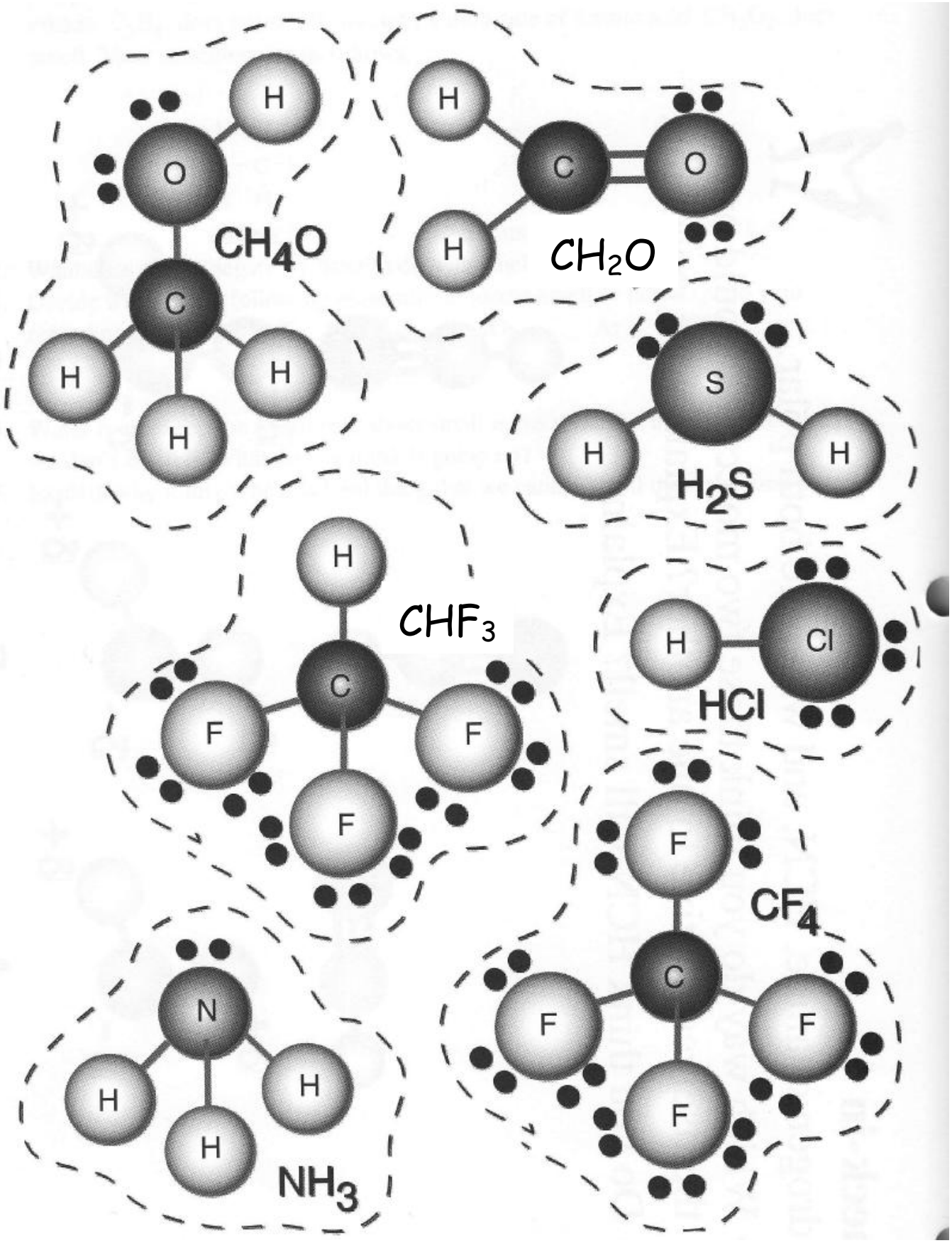
3. Do you think the lining of the nose and its receptor sites are polar or non polar? Explain.

4. a) What do you think would happen if a polar molecule drifted into the nose?

   b) What about a nonpolar molecule?

5. We know that the mucous in the lining of the nose is mostly water. How do you think this relates to the smelling of molecules?

6. How does polarity help to explain what is happening between smell molecules and the receptor in the nose?


H
O
C
H
H
H
CH_4O
H
C
O
H
CH_2O
S
H
H
H_2S
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C
F
F
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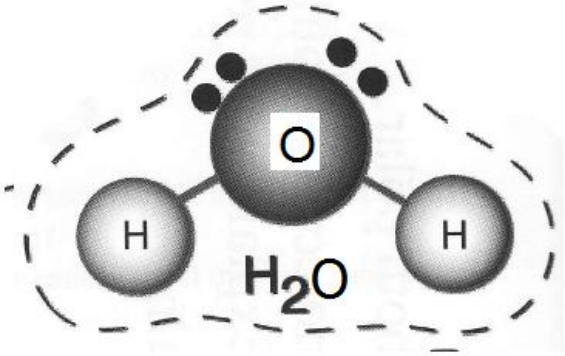
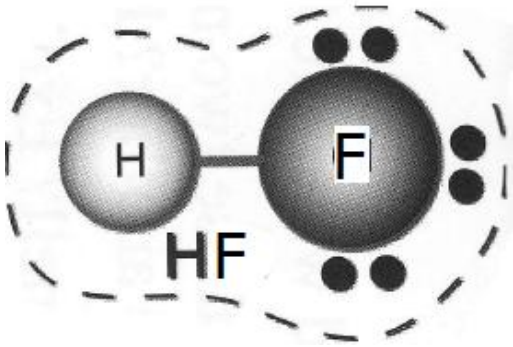
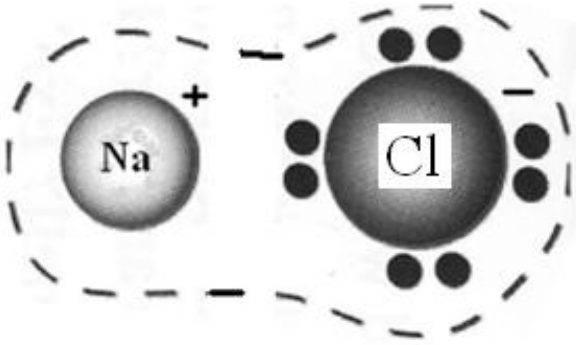
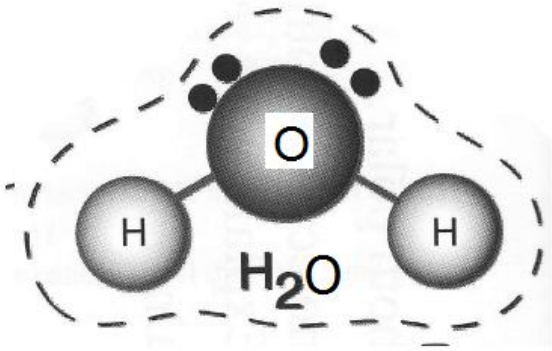
F
F
CF_4
N
H
H
H
NH_3


O
H
H
H_2O


H
F
HF


Na
+
Cl
−
−


O
H
H
H_2O