

POGIL: It's All In the Name

Name:

Group Members:

Objective:

Given a covalent compound, write the proper formula or the correct name.

Model I: Because Sharing is Caring

Information:

We will be using gases and other compounds as illustrations of naming covalent compounds. Covalent compounds are defined as groups of atoms that stay together because of **shared electrons** in chemical bonds. There are an infinite number of covalent compounds. Here we will be focusing on naming some of the smaller covalent compounds.

The names of covalent compounds are similar to those of the ionic compounds, but there are differences. Use the Model to see if you can figure out how the rules differ.

Compound Name	Molecular Formula
phosphorus pentafluoride	PF ₅
tetraiodine nonoxide	I ₄ O ₉
dinitrogen trioxide	N ₂ O ₃
sulfur hexachloride	SCl ₆
dinitrogen monoxide	N ₂ O
difluorine octaoxide	F ₂ O ₈
dichlorine heptasulfide	Cl ₂ S ₇
tetracarbon decahydride	C ₄ H ₁₀

Reviewing the Model:

1. Where in the periodic table do you find all of the elements used in Model I.
2. What suffix is used for all second names in the compounds.
3. Is the name of the first element in each compound changed as it goes from an individual element to a compound?
4. How is the name of the second element in each compound in each name changed as it goes from an individual element to a compound?

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- How many atoms of nitrogen are present in dinitrogen tetroxide?
- How many atoms of fluorine are present in phosphorus hexafluoride?

Exploring the Model:

- Use the model to fill in the following table with prefixes used to designate the number of each type of atom in a binary molecular compound.

Prefix	# of atoms	Prefix	# of atoms
	1		6
	2		7
	3		8
	4		9
	5		10

Exercising Your Knowledge:

- For each compound given below, fill in the correct name or the correct formula, which ever is missing.

	PCl_3
sulfur difluoride	
	P_4O_{10}
carbon tetrachloride	
	N_2O_4

Summarizing Your Knowledge:

- Write a rule to describe when and how you use prefixes in naming compounds.

Model II: Where's the Water? It's in the Hydrates!

Hydrate: an ionic compound with loosely attached water molecules. These compounds release the water when heated.

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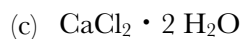
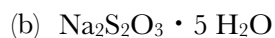
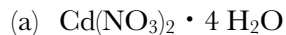
Example: $\text{CuSO}_4 \cdot 5 \text{H}_2\text{O}$

Cu	SO_4	·	5	H_2O
copper(II)	sulfate	loosely attached water	penta	hydrate

Example: $\text{AlCl}_3 \cdot 6 \text{H}_2\text{O}$

Al	Cl_3	·	6	H_2O
aluminum	chloride	loosely attached water	hexa	hydrate

10. Provide names for the following hydrated salts.



Model III: At the Beginning, It's All About the Ending . . . The Acids

ACID: molecular compound that released hydronium ions when dissolved in water to create an aqueous solution

The element generally associated with acids is hydrogen. Acids “appear” to be ionic since the number of hydrogen atoms in the formula for an acid balance the charge of the anion on which the acid is based.

The name the acid, it all comes down to the ending of the “ion” in the acid.

ending	Acid name is . . .	Ion example(s)	Acid name/Formula
<i>-ide</i>	hydro-stem-ic acid	chloride cyanide	hydrochloric acid, HCl hydrocyanic acid, HCN
<i>-ate</i>	stem-ic acid	nitrate sulfate	nitric acid, HNO_3 sulfuric acid, H_2SO_4
<i>-ite</i>	stem-ous acid	nitrite sulfite	nitrous acid, HNO_2 sulfurous acid, H_2SO_3

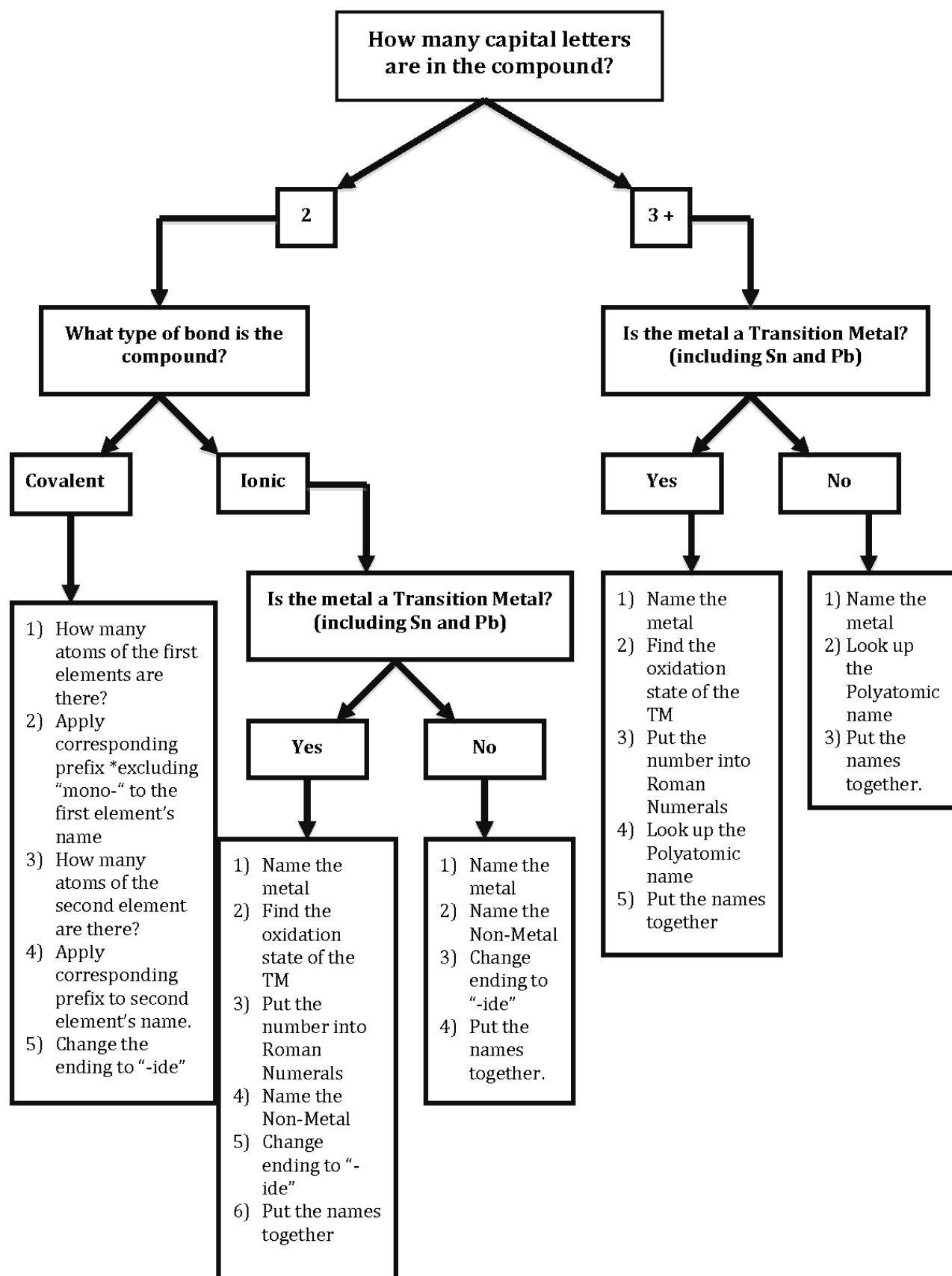
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11. Use the information from the table above and complete the table of acids.

Name of Anion	Name of Acid	Formula of Acid
		HI
iodate		
	chloric acid	
		$H_2S_2O_3$
sulfide		
	phosphoric acid	H_3PO_4
		H_3P
carbonate		
	acetic acid	
		$H_2C_2O_4$
hypochlorite		
	thiocyanic acid	



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