

## CONCEPT: NITROGEN FAMILY REACTIONS

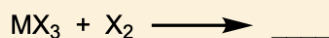
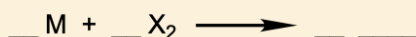
- Reactions are driven by the presence of \_\_\_ valence electrons in their s and p subshells.
  - Will cover 2 types of reactions: reacting with (1) \_\_\_\_\_ & (2) \_\_\_\_\_.

### (1) Reaction with Halogens

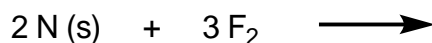
- The Nitrogen Family elements react with halogens to produce \_\_\_ halides and \_\_\_ halides.
  - Recall, nonmetals from Period \_\_\_ or lower can have expanded octets.
    - \_\_\_ and \_\_\_ cannot produce pentahalides.

	1A			3A	4A	5A
	(1)	(2)		(13)	(14)	(15)
1	H Hydrogen					N Nitrogen
2	Li Lithium	Be Beryllium		B Boron	C Carbon	P Phosphorus
3	Na Sodium	Mg Magnesium		Al Aluminum	Si Silicon	As Arsenic
4	K Potassium	Ca Calcium		Ga Gallium	Ge Germanium	Sb Antimony
5	Rb Rubidium	Sr Strontium		In Indium	Sn Tin	Bi Bismuth
6	Cs Cesium	Ba Barium		Tl Thallium	Pb Lead	
7	Fr Francium	Ra Radium		Nh Nihonium	Fl Flerovium	Mc Moscovium

#### Reaction with Halogens



**EXAMPLE:** Determine the product formed in the following reaction.



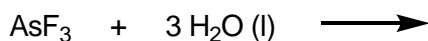
### (2) Reaction with H<sub>2</sub>O

- The trihalides and pentahalides can react with H<sub>2</sub>O to form oxyacids.
  - Recall:** oxyacids are covalent compounds containing a hydrogen atom bonded to an oxyanion.
  - Exception:** The trihalides of N are not involved in these reactions.

#### Reaction with H<sub>2</sub>O



**EXAMPLE:** Complete and balance the following reaction.



**CONCEPT: NITROGEN FAMILY REACTIONS**

**PRACTICE:** Provide the products from the reaction between 2 moles of antimony with four moles of chlorine.



**PRACTICE:** Name the oxyacid created from the reaction between phosphorus trichloride and 3 moles of water.

a) hydrophorous acid

b) phoric acid

c) phosphorous acid

d) phosphoric acid