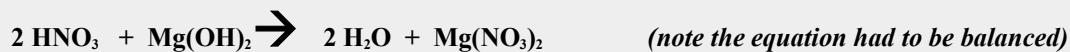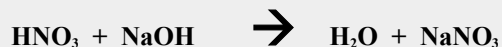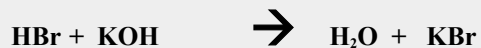Name: _____

Unit 6 - Topic 6
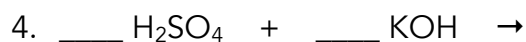Neutralization & Titration

Neutralization Reactions
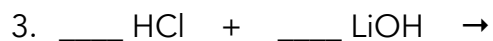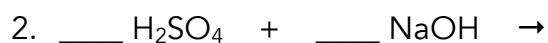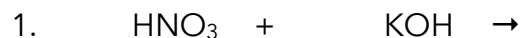

When an acid reacts with a base, an ionic salt and water are formed.

$HCl + NaOH \rightarrow H_2O + NaCl$

$HBr + KOH \rightarrow H_2O + KBr$

$HNO_3 + NaOH \rightarrow H_2O + NaNO_3$

$H_2SO_4 + 2 KOH \rightarrow 2 H_2O + K_2SO_4$ (*note the equation had to be balanced*)

$2 HNO_3 + Mg(OH)_2 \rightarrow 2 H_2O + Mg(NO_3)_2$ (*note the equation had to be balanced*)

A neutral solution is formed when the right number of moles of strong acid reacts with strong base.

Neutralization occurs when the concentration of H_3O^+ ions <u>equals</u> the concentration of OH^- ions.

Write the products and ***balance*** the equation for each of the following reactions.

Example: 2 HBr + 1 Mg(OH)₂ → 1MgBr₂ + 2 H₂O

1. ____ HNO_3 + ____ KOH →

2. ____ H_2SO_4 + ____ NaOH →

3. ____ HCl + ____ LiOH →

4. ____ H_2SO_4 + ____ KOH →

5. ____ HI + ____ Ca(OH)₂ →

Titration Calculations

Use the titration equation on Table T. Show all of your work using the ESA method (Equation, Substitute with units, Answer with units).

1. How much 6.0 M HNO_3 is needed to neutralize 39 mL of 2.0 M KOH?

2. How much 3.0 M NaOH is needed to neutralize 30.0 mL of 0.75 M H_2SO_4?

3. What is the concentration of 20 mL of LiOH if it is neutralized by 60 mL of 4 M HCl?

4. What is the concentration of 60 mL of H_3PO_4 if it is neutralized by 225 mL of 2 M $Ba(OH)_2$?

5. How much 2 M HBr is needed to neutralize 380 mL of 0.1 M NH_4OH?

The answers to the questions above are all integers. Each answer stands for a letter of the alphabet. Write the correct letters in the spaces below to find the solution to the riddle.

ANSWERS:	1	2	3	4	5	6	7	8	9	10	11	12	13
LETTERS:	A	B	C	D	E	F	G	H	I	J	K	L	M

ANSWERS:	14	15	16	17	18	19	20	21	22	23	24	25	26
LETTERS:	N	O	P	Q	R	S	T	U	V	W	X	Y	Z

RIDDLE: How many varmints does it take to ruin a chemist's lawn?

SOLUTION: _____ _____ _____ _____ _____
Question 1   Question 2   Question 3   Question 4   Question 5