

NAME: \_\_\_\_\_ Date: \_\_\_\_\_

ALT 4a (Chemical Equations) Practice for Retakes Toxins Unit

**Subtarget 4.5** Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. [NGSS HS-PS1-7]. Emphasis on balancing and conservation of mass.

1. For the following (unbalanced) reactions determine if they are physical, chemical reactions and explain why:

Reaction	Physical or Chemical	Why?
$\text{Na} + \text{MgF}_2 \rightarrow \text{NaF} + \text{Mg}$		
$\text{NO}_2 (\text{g}) \rightarrow \text{NO}_2 (\text{s})$		
$\text{K} + \text{Cl}_2 \rightarrow \text{KCl}$		
$\text{CO}_2(\text{s}) \rightarrow \text{CO}_2 (\text{g})$		
** $\text{C}_2\text{H}_6 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$		

2. Balance the following reactions using coefficients and the law of conservation of mass:

Reaction:	Inventory
___ Na + ___ MgF <sub>2</sub> → ___ NaF + ___ Mg	
___ Na + ___ HCl → ___ H <sub>2</sub> + ___ NaCl	
___ K + ___ Cl <sub>2</sub> → ___ KCl	
___ NO <sub>2</sub> + ___ H <sub>2</sub> O → ___ HNO <sub>3</sub> + ___ NO	
** ___ C <sub>2</sub> H <sub>6</sub> + ___ O <sub>2</sub> → ___ CO <sub>2</sub> + ___ H <sub>2</sub> O	

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**Subtarget 4.5** Use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. [NGSS HS-PS1-7]. Emphasis on balancing and conservation of mass.

1. For the following (unbalanced) reactions determine if they are physical, chemical reactions and explain why:

Reaction	Physical or Chemical	Why?
$\text{Na} + \text{MgF}_2 \rightarrow \text{NaF} + \text{Mg}$	Chemical	products different from reactants.
$\text{NO}_2 (\text{g}) \rightarrow \text{NO}_2 (\text{s})$	Physical	nitrogen dioxide gas is being <del>above</del> solidified
$\text{K} + \text{Cl}_2 \rightarrow \text{KCl}$	Chemical	K and Cl bonded to make a new compound.
$\text{CO}_2 (\text{s}) \rightarrow \text{CO}_2 (\text{g})$	physical	dry ice (Carbon dioxide) is sublimating to a gas.
** $\text{C}_2\text{H}_6 + \text{O}_2 \rightarrow \text{CO}_2 + \text{H}_2\text{O}$	Chemical	ethane is Combusting (burning) in oxygen to form new products

2. Balance the following reactions using coefficients and the law of conservation of mass:

Reaction: 1	Inventory									
$\textcircled{2} \text{Na} + \text{MgF}_2 \rightarrow \textcircled{2} \text{NaF} + \text{Mg}$	<table style="margin: auto;"> <tr><td>Na</td><td>+2</td><td>+2</td></tr> <tr><td>Mg</td><td>1</td><td>1</td></tr> <tr><td>F</td><td>2</td><td>+2</td></tr> </table>	Na	+2	+2	Mg	1	1	F	2	+2
Na	+2	+2								
Mg	1	1								
F	2	+2								
$2 \text{Na} + 2 \text{HCl} \rightarrow \text{H}_2 + 2 \text{NaCl}$	<table style="margin: auto;"> <tr><td>Na</td><td>+2</td><td>+2</td></tr> <tr><td>H</td><td>+2</td><td>2</td></tr> <tr><td>Cl</td><td>+2</td><td>+2</td></tr> </table>	Na	+2	+2	H	+2	2	Cl	+2	+2
Na	+2	+2								
H	+2	2								
Cl	+2	+2								
$2 \text{K} + \text{Cl}_2 \rightarrow 2 \text{KCl}$	<table style="margin: auto;"> <tr><td>K</td><td>+2</td><td>+2</td></tr> <tr><td>Cl</td><td>2</td><td>+2</td></tr> </table>	K	+2	+2	Cl	2	+2			
K	+2	+2								
Cl	2	+2								
$3 \text{NO}_2 + \text{H}_2\text{O} \rightarrow 2 \text{HNO}_3 + \text{NO}$	<table style="margin: auto;"> <tr><td>N</td><td>+3</td><td>+3</td></tr> <tr><td>O</td><td>3 + 1 = 4</td><td>+7</td></tr> <tr><td>H</td><td>2</td><td>+2</td></tr> </table>	N	+3	+3	O	3 + 1 = 4	+7	H	2	+2
N	+3	+3								
O	3 + 1 = 4	+7								
H	2	+2								
** $2 \text{C}_2\text{H}_6 + 7 \text{O}_2 \rightarrow 4 \text{CO}_2 + 6 \text{H}_2\text{O}$	<table style="margin: auto;"> <tr><td>C</td><td>2 + 2 = 4</td><td>+4</td></tr> <tr><td>H</td><td>2 + 2 = 4</td><td>+12</td></tr> <tr><td>O</td><td>2 + 7 = 9</td><td>3 + 6 = 9</td></tr> </table>	C	2 + 2 = 4	+4	H	2 + 2 = 4	+12	O	2 + 7 = 9	3 + 6 = 9
C	2 + 2 = 4	+4								
H	2 + 2 = 4	+12								
O	2 + 7 = 9	3 + 6 = 9								