Nobody Likes Leftovers

Activity 1: The Perfect Match
Question Group 1
Question 1
Consider the reaction: $N_2 + 3\ H_2 \rightarrow 2\ NH_3$

Complete the **Mole Table** below assuming that the two reactants are available in amounts that match the ratios given by the coefficients of the balanced chemical equation. In other words, there are no left-over reactants.

	Moles N_2	+	Moles H_2	→	Moles NH_3
1	2.00				
2			9.00		
3	5.00				
4					12.0
5	8.54				
6			29.2		

Question 2

Consider the reaction: $N_2 + 3\ H_2 \rightarrow 2\ NH_3$

Complete the **Mole Table** below assuming that the two reactants are available in amounts that match the ratios given by the coefficients of the balanced chemical equation. In other words, there are no left-over reactants.

	Moles N_2	+	Moles H_2	→	Moles NH_3
1	1.50				
2			6.00		
3	6.00				
4					14.0
5	9.21				
6			32.6		

Question 3

Consider the reaction: $N_2 + 3\ H_2 \rightarrow 2\ NH_3$

Complete the **Mole Table** below assuming that the two reactants are available in amounts that match the ratios given by the coefficients of the balanced chemical equation. In other words, there are no left-over reactants.

	Moles N_2	+	Moles H_2	→	Moles NH_3
1	3.00				
2			12.00		
3	6.00				
4					18.0
5	9.20				
6			38.6		

Question 4

Consider the reaction: $N_2 + 3\ H_2 \rightarrow 2\ NH_3$

Complete the **Mole Table** below assuming that the two reactants are available in amounts that match the ratios given by the coefficients of the balanced chemical equation. In other words, there are no left-over reactants.

	Moles N_2	+	Moles H_2	→	Moles NH_3
1	4.00				
2			15.00		
3	8.00				
4					18.0
5	9.62				
6			41.6		

Activity 2: Moles on ICE
Question Group 2
Question 5
Consider the following reaction: $N_2 + 3\ H_2 \rightarrow 2\ NH_3$

The **ICE Table** shows the **I**nitial # of Moles of the two reactants and one product. Use coefficients to determine the **C**hange in the # of Moles and the **E**nding # of Moles of the two reactants and one product.

ICE means …
I = **I**nitial Amount
C = **C**hange (reacted/produced)
E = **E**nding or Final Amount

	Moles N_2	+	Moles H_2	→	Moles NH_3
I	4.00		9.00		0.00
C	-		-		+
E					

Question 6
Consider the following reaction: $N_2 + 3\ H_2 \rightarrow 2\ NH_3$

The **ICE Table** shows the **I**nitial # of Moles of the two reactants and one product. Use coefficients to determine the **C**hange in the # of Moles and the **E**nding # of Moles of the two reactants and one product.

ICE means …
I = **I**nitial Amount
C = **C**hange (reacted/produced)
E = **E**nding or Final Amount

	Moles N_2	+	Moles H_2	→	Moles NH_3
I	3.00		10.00		0.00
C	-		-		+
E					

Question 7

Consider the following reaction: $N_2 + 3\,H_2 \rightarrow 2\,NH_3$

The **ICE Table** shows the **I**nitial # of Moles of the two reactants and one product. Use coefficients to determine the **C**hange in the # of Moles and the **E**nding # of Moles of the two reactants and one product.

ICE means …

I = **I**nitial Amount

C = **C**hange (reacted/produced)

E = **E**nding or Final Amount

	Moles N_2	+	Moles H_2	→	Moles NH_3
I	**5.00**		**12.00**		**0.00**
C	-		-		+
E					

Question 8

Consider the following reaction: $N_2 + 3\,H_2 \rightarrow 2\,NH_3$

The **ICE Table** shows the **I**nitial # of Moles of the two reactants and one product. Use coefficients to determine the **C**hange in the # of Moles and the **E**nding # of Moles of the two reactants and one product.

ICE means …

I = **I**nitial Amount

C = **C**hange (reacted/produced)

E = **E**nding or Final Amount

	Moles N_2	+	Moles H_2	→	Moles NH_3
I	**5.00**		**18.00**		**0.00**
C	-		-		+
E					

Question Group 3
Question 9
Consider the following reaction: $2\ H_2 + O_2 \rightarrow 2\ H_2O$

The **ICE Table** shows the **I**nitial # of Moles of the two reactants and one product. Use coefficients to determine the **C**hange in the # of Moles and the **E**nding # of Moles of the two reactants and one product.

ICE means …
I = **I**nitial Amount
C = **C**hange (reacted/produced)
E = **E**nding or Final Amount

	Moles H_2	+	Moles O_2	→	Moles H_2O
I	**6.00**		**4.00**		**0.00**
C	-		-		+
E					

Question 10
Consider the following reaction: $2\ H_2 + O_2 \rightarrow 2\ H_2O$

The **ICE Table** shows the **I**nitial # of Moles of the two reactants and one product. Use coefficients to determine the **C**hange in the # of Moles and the **E**nding # of Moles of the two reactants and one product.

ICE means …
I = **I**nitial Amount
C = **C**hange (reacted/produced)
E = **E**nding or Final Amount

	Moles H_2	+	Moles O_2	→	Moles H_2O
I	**8.00**		**3.00**		**0.00**
C	-		-		+
E					

Question 11

Consider the following reaction: $2\ H_2 + O_2 \rightarrow 2\ H_2O$

The **ICE Table** shows the **I**nitial # of Moles of the two reactants and one product. Use coefficients to determine the **C**hange in the # of Moles and the **E**nding # of Moles of the two reactants and one product.

ICE means …

I = **I**nitial Amount

C = **C**hange (reacted/produced)

E = **E**nding or Final Amount

	Moles H_2	+	Moles O_2	→	Moles H_2O
I	**5.00**		**2.00**		**0.00**
C	-		-		+
E					

Question 12

Consider the following reaction: $2\ H_2 + O_2 \rightarrow 2\ H_2O$

The **ICE Table** shows the **I**nitial # of Moles of the two reactants and one product. Use coefficients to determine the **C**hange in the # of Moles and the **E**nding # of Moles of the two reactants and one product.

ICE means …

I = **I**nitial Amount

C = **C**hange (reacted/produced)

E = **E**nding or Final Amount

	Moles H_2	+	Moles O_2	→	Moles H_2O
I	**8.00**		**5.00**		**0.00**
C	-		-		+
E					

Question Group 4
Question 13
Consider the following reaction: $4\ Na + O_2 \rightarrow 2\ Na_2O$

The **ICE Table** shows the **I**nitial # of Moles of the two reactants and one product. Use coefficients to determine the **C**hange in the # of Moles and the **E**nding # of Moles of the two reactants and one product.

ICE means …
I = **I**nitial Amount
C = **C**hange (reacted/produced)
E = **E**nding or Final Amount

	Moles Na	+	Moles O_2	→	Moles Na_2O
I	12.00		4.00		0.00
C	-		-		+
E					

Question 14
Consider the following reaction: $4\ Na + O_2 \rightarrow 2\ Na_2O$

The **ICE Table** shows the **I**nitial # of Moles of the two reactants and one product. Use coefficients to determine the **C**hange in the # of Moles and the **E**nding # of Moles of the two reactants and one product.

ICE means …
I = **I**nitial Amount
C = **C**hange (reacted/produced)
E = **E**nding or Final Amount

	Moles Na	+	Moles O_2	→	Moles Na_2O
I	20.00		4.00		0.00
C	-		-		+
E					

Question 15

Consider the following reaction: $4\ Na + O_2 \rightarrow 2\ Na_2O$

The **ICE Table** shows the **I**nitial # of Moles of the two reactants and one product. Use coefficients to determine the **C**hange in the # of Moles and the **E**nding # of Moles of the two reactants and one product.

ICE means …

I = **I**nitial Amount

C = **C**hange (reacted/produced)

E = **E**nding or Final Amount

	Moles Na	+	Moles O_2	→	Moles Na_2O
I	16.00		3.00		0.00
C	-		-		+
E					

Question 16

Consider the following reaction: $4\ Na + O_2 \rightarrow 2\ Na_2O$

The **ICE Table** shows the **I**nitial # of Moles of the two reactants and one product. Use coefficients to determine the **C**hange in the # of Moles and the **E**nding # of Moles of the two reactants and one product.

ICE means …

I = **I**nitial Amount

C = **C**hange (reacted/produced)

E = **E**nding or Final Amount

	Moles Na	+	Moles O_2	→	Moles Na_2O
I	16.00		5.00		0.00
C	-		-		+
E					

Question Group 5
Question 17
Consider the following reaction: $2\ Ca + O_2 \rightarrow 2\ CaO$

The **ICE Table** shows the **I**nitial # of Moles of the two reactants and one product. Use coefficients to determine the **C**hange in the # of Moles and the **E**nding # of Moles of the two reactants and one product.

ICE means …
I = **I**nitial Amount
C = **C**hange (reacted/produced)
E = **E**nding or Final Amount

	Moles Ca	+	Moles O_2	→	Moles CaO
I	13.00		7.00		0.00
C	-		-		+
E					

Question 18
Consider the following reaction: $2\ Ca + O_2 \rightarrow 2\ CaO$

The **ICE Table** shows the **I**nitial # of Moles of the two reactants and one product. Use coefficients to determine the **C**hange in the # of Moles and the **E**nding # of Moles of the two reactants and one product.

ICE means …
I = **I**nitial Amount
C = **C**hange (reacted/produced)
E = **E**nding or Final Amount

	Moles Ca	+	Moles O_2	→	Moles CaO
I	17.00		8.00		0.00
C	-		-		+
E					

Question 19

Consider the following reaction: $2\ Ca + O_2 \rightarrow 2\ CaO$

The **ICE Table** shows the **I**nitial # of Moles of the two reactants and one product. Use coefficients to determine the **C**hange in the # of Moles and the **E**nding # of Moles of the two reactants and one product.

ICE means …

I = **I**nitial Amount

C = **C**hange (reacted/produced)

E = **E**nding or Final Amount

	Moles Ca	+	Moles O_2	→	Moles CaO
I	21.00		12.00		0.00
C	-		-		+
E					

Question 20

Consider the following reaction: $2\ Ca + O_2 \rightarrow 2\ CaO$

The **ICE Table** shows the **I**nitial # of Moles of the two reactants and one product. Use coefficients to determine the **C**hange in the # of Moles and the **E**nding # of Moles of the two reactants and one product.

ICE means …

I = **I**nitial Amount

C = **C**hange (reacted/produced)

E = **E**nding or Final Amount

	Moles Ca	+	Moles O_2	→	Moles CaO
I	17.00		10.00		0.00
C	-		-		+
E					

Activity 3: Mass on ICE
Question Group 6
Question 21

Consider the following reaction: $N_2 + 3\ H_2 \rightarrow 2\ NH_3$

The **ICE Table** shows the **I**nitial mass (in grams) of two reactants and product. Determine the **C**hange in mass (in grams) and the **E**nding mass (in grams) of reactants and product. Identify the limiting reactant.

ICE means …
I = **I**nitial Amount
C = **C**hange (reacted/produced)
E = **E**nding or Final Amount

	Mass N_2	+	Mass H_2	→	Mass NH_3
I	28.00		10.00		0.00
C	-		-		+
E					

Question 22

Consider the following reaction: $N_2 + 3\ H_2 \rightarrow 2\ NH_3$

The **ICE Table** shows the **I**nitial mass (in grams) of two reactants and product. Determine the **C**hange in mass (in grams) and the **E**nding mass (in grams) of reactants and product. Identify the limiting reactant.

ICE means …
I = **I**nitial Amount
C = **C**hange (reacted/produced)
E = **E**nding or Final Amount

	Mass N_2	+	Mass H_2	→	Mass NH_3
I	14.00		4.00		0.00
C	-		-		+
E					

Question 23

Consider the following reaction: $N_2 + 3\,H_2 \rightarrow 2\,NH_3$

The **ICE Table** shows the **I**nitial mass (in grams) of two reactants and product. Determine the **C**hange in mass (in grams) and the **E**nding mass (in grams) of reactants and product. Identify the limiting reactant.

ICE means …

I = **I**nitial Amount

C = **C**hange (reacted/produced)

E = **E**nding or Final Amount

	Mass N_2	+	Mass H_2	→	Mass NH_3
I	40.00		6.00		0.00
C	-		-		+
E					

Question 24

Consider the following reaction: $N_2 + 3\,H_2 \rightarrow 2\,NH_3$

The **ICE Table** shows the **I**nitial mass (in grams) of two reactants and product. Determine the **C**hange in mass (in grams) and the **E**nding mass (in grams) of reactants and product. Identify the limiting reactant.

ICE means …

I = **I**nitial Amount

C = **C**hange (reacted/produced)

E = **E**nding or Final Amount

	Mass N_2	+	Mass H_2	→	Mass NH_3
I	60.00		12.00		0.00
C	-		-		+
E					

Question Group 7
Question 25
Consider the following reaction: $2\ H_2 + O_2 \rightarrow 2\ H_2O$

The **ICE Table** shows the **I**nitial mass (in grams) of two reactants and product. Determine the **C**hange in mass (in grams) and the **E**nding mass (in grams) of reactants and product. Identify the limiting reactant.

ICE means …
I = **I**nitial Amount
C = **C**hange (reacted/produced)
E = **E**nding or Final Amount

	Mass H_2	+	Mass O_2	→	Mass H_2O
I	8.00		80.00		0.00
C	-		-		+
E					

Question 26
Consider the following reaction: $2\ H_2 + O_2 \rightarrow 2\ H_2O$

The **ICE Table** shows the **I**nitial mass (in grams) of two reactants and product. Determine the **C**hange in mass (in grams) and the **E**nding mass (in grams) of reactants and product. Identify the limiting reactant.

ICE means …
I = **I**nitial Amount
C = **C**hange (reacted/produced)
E = **E**nding or Final Amount

	Mass H_2	+	Mass O_2	→	Mass H_2O
I	8.00		48.00		0.00
C	-		-		+
E					

Question 27

Consider the following reaction: $2\ H_2 + O_2 \rightarrow 2\ H_2O$

The **ICE Table** shows the **I**nitial mass (in grams) of two reactants and product. Determine the **C**hange in mass (in grams) and the **E**nding mass (in grams) of reactants and product. Identify the limiting reactant.

ICE means …

I = **I**nitial Amount

C = **C**hange (reacted/produced)

E = **E**nding or Final Amount

	Mass H_2	+	Mass O_2	→	Mass H_2O
I	**2.00**		**20.00**		**0.00**
C	-		-		+
E					

Question 28

Consider the following reaction: $2\ H_2 + O_2 \rightarrow 2\ H_2O$

The **ICE Table** shows the **I**nitial mass (in grams) of two reactants and product. Determine the **C**hange in mass (in grams) and the **E**nding mass (in grams) of reactants and product. Identify the limiting reactant.

ICE means …

I = **I**nitial Amount

C = **C**hange (reacted/produced)

E = **E**nding or Final Amount

	Mass H_2	+	Mass O_2	→	Mass H_2O
I	**3.00**		**16.00**		**0.00**
C	-		-		+
E					

Question Group 8
Question 29
Consider the following reaction: $4\ Na + O_2 \rightarrow 2\ Na_2O$

The **ICE Table** shows the **I**nitial mass (in grams) of two reactants and product. Determine the **C**hange in mass (in grams) and the **E**nding mass (in grams) of reactants and product. Identify the limiting reactant.

ICE means …
I = **I**nitial Amount
C = **C**hange (reacted/produced)
E = **E**nding or Final Amount

	Mass Na	+	Mass O_2	→	Mass Na_2O
I	46.00		20.00		0.00
C	-		-		+
E					

Question 30
Consider the following reaction: $4\ Na + O_2 \rightarrow 2\ Na_2O$

The **ICE Table** shows the **I**nitial mass (in grams) of two reactants and product. Determine the **C**hange in mass (in grams) and the **E**nding mass (in grams) of reactants and product. Identify the limiting reactant.

ICE means …
I = **I**nitial Amount
C = **C**hange (reacted/produced)
E = **E**nding or Final Amount

	Mass Na	+	Mass O_2	→	Mass Na_2O
I	54.00		16.00		0.00
C	-		-		+
E					

Question 31

Consider the following reaction: $4\ Na + O_2 \rightarrow 2\ Na_2O$

The **ICE Table** shows the **I**nitial mass (in grams) of two reactants and product. Determine the **C**hange in mass (in grams) and the **E**nding mass (in grams) of reactants and product. Identify the limiting reactant.

ICE means …

I = **I**nitial Amount

C = **C**hange (reacted/produced)

E = **E**nding or Final Amount

	Mass Na	+	Mass O_2	→	Mass Na_2O
I	**100.00**		**32.00**		**0.00**
C	-		-		+
E					

Question 32

Consider the following reaction: $4\ Na + O_2 \rightarrow 2\ Na_2O$

The **ICE Table** shows the **I**nitial mass (in grams) of two reactants and product. Determine the **C**hange in mass (in grams) and the **E**nding mass (in grams) of reactants and product. Identify the limiting reactant.

ICE means …

I = **I**nitial Amount

C = **C**hange (reacted/produced)

E = **E**nding or Final Amount

	Mass Na	+	Mass O_2	→	Mass Na_2O
I	**92.00**		**40.00**		**0.00**
C	-		-		+
E					

Question Group 9
Question 33
Consider the following reaction: $2\ Ca + O_2 \rightarrow 2\ CaO$

The **ICE Table** shows the **I**nitial mass (in grams) of two reactants and product. Determine the **C**hange in mass (in grams) and the **E**nding mass (in grams) of reactants and product. Identify the limiting reactant.

ICE means …
I = **I**nitial Amount
C = **C**hange (reacted/produced)
E = **E**nding or Final Amount

	Mass Ca	+	Mass O_2	→	Mass CaO
I	80.00		40.00		0.00
C	-		-		+
E					

Question 34
Consider the following reaction: $2\ Ca + O_2 \rightarrow 2\ CaO$

The **ICE Table** shows the **I**nitial mass (in grams) of two reactants and product. Determine the **C**hange in mass (in grams) and the **E**nding mass (in grams) of reactants and product. Identify the limiting reactant.

ICE means …
I = **I**nitial Amount
C = **C**hange (reacted/produced)
E = **E**nding or Final Amount

	Mass Ca	+	Mass O_2	→	Mass CaO
I	90.00		32.00		0.00
C	-		-		+
E					

Question 35

Consider the following reaction: $2\ Ca + O_2 \rightarrow 2\ CaO$

The **ICE Table** shows the **I**nitial mass (in grams) of two reactants and product. Determine the **C**hange in mass (in grams) and the **E**nding mass (in grams) of reactants and product. Identify the limiting reactant.

ICE means …

I = **I**nitial Amount

C = **C**hange (reacted/produced)

E = **E**nding or Final Amount

	Mass Ca	+	Mass O_2	→	Mass CaO
I	40.00		20.00		0.00
C	-		-		+
E					

Question 36

Consider the following reaction: $2\ Ca + O_2 \rightarrow 2\ CaO$

The **ICE Table** shows the **I**nitial mass (in grams) of two reactants and product. Determine the **C**hange in mass (in grams) and the **E**nding mass (in grams) of reactants and product. Identify the limiting reactant.

ICE means …

I = **I**nitial Amount

C = **C**hange (reacted/produced)

E = **E**nding or Final Amount

	Mass Ca	+	Mass O_2	→	Mass CaO
I	50.00		16.00		0.00
C	-		-		+
E					