Stoichiometry Worksheet and Key

$$2\ KClO_3 \rightarrow 2\ KCl\ +\ 3\ O_2$$

1. How many moles of O_2 will be formed from 1.65 moles of $KClO_3$?

$$\frac{1.65\ mol\ KClO_3}{}\ \left|\ \frac{\_\_\ mol\ O_2}{\_\_mol\ KClO_3}\ \right|\ =\ \_\_\_\_\ mol\ O_2$$

2. How many moles of $KClO_3$ are needed to make 3.50 moles of KCl?

$$\frac{3.50mol\ KCl}{}\ \left|\ \ \right|\ =\ \_\_\_\_\ mol\ KClO_3$$

3. How many moles of KCl will be formed from 2.73 moles of $KClO_3$?

$$_____\ \left|\ \ \right|\ =\ \_\_\_$$

$$4\ Fe\ +\ 3\ O_2 \rightarrow 2\ Fe_2O_3$$

4. How many moles of Fe_2O_3 are produced when 0.275 moles of Fe is reacted?

$$\frac{0.275\ mol\ Fe}{}\ \left|\ \ \right|\ =\ \_\_\_\_\ mol\ Fe_2O_3$$

5. How many moles of Fe_2O_3 are produced when 31.0 moles of O_2 is reacted?

$$_____\ \left|\ \ \right|\ =\ \_\_\_$$

6. How many moles of O_2 are needed to react with 8.9 moles of Fe?

$$_____\ \left|\ \ \right|\ =\ \_\_\_$$

$$2\ H_2O \rightarrow 2\ H_2\ +\ O_2$$

7. How many moles of O_2 are produced when 1.26 moles of H_2O is reacted?

8. How many moles of H_2O are needed to produce 55.7 moles of H_2?

9. If enough H_2O is reacted to produce 3.40 moles of H_2, then how may moles of O_2 must have been made?
   (a bit challenging, but just think about it and you can probably figure it out)

$$2 \text{ KClO}_3 \rightarrow 2 \text{ KCl} + 3 \text{ O}_2$$

10. How many **grams** of O_2 will be formed from 3.76 grams of $KClO_3$?

3.76g $KClO_3$	1 mol $KClO_3$	___ mol O_2	___ g O_2	
	122.55 g $KClO_3$	___ mol $KClO_3$	___ mol O_2	= _____ g O_2

11. How many **grams** of $KClO_3$ are needed to make 30.0 grams of KCl?

30.0 g KCl	____ mol KCl	___ mol $KClO_3$	___ g $KClO_3$	
	____ g KCl	___ mol KCl	___ mol $KClO_3$	= _____ g $KClO_3$

12. How many grams of KCl will be formed from 2.73 g of $KClO_3$?

2.73 g $KClO_3$				
				= _____ g KCl

$$4 \text{ Fe} + 3 \text{ O}_2 \rightarrow 2 \text{ Fe}_2\text{O}_3$$

13. How many **grams** of Fe_2O_3 are produced when 42.7 **grams** of Fe is reacted?

42.7 g Fe	____ mol Fe	___ mol Fe_2O_3	___ g Fe_2O_3	
	____ g Fe	___ mol Fe	___ mol Fe_2O_3	= _____ g Fe_2O_3

14. How many **grams** of Fe_2O_3 are produced when 17.0 grams of O_2 is reacted?

17.0 g O_2				
				= _____ g Fe_2O_3

15. How many grams of O_2 are needed to react with 125 grams of Fe?

				= _____

Some cars can use butane (C_4H_{10}) as fuel:
$$2 \text{ C}_4\text{H}_{10} + 13 \text{ O}_2 \rightarrow 8 \text{ CO}_2 + 10 \text{ H}_2\text{O}$$

16. How many grams of CO_2 are produced from the combustion of 100. grams of butane?

100. g C_4H_{10}				
				= _____ g CO_2

17. How many grams of O_2 are needed to react with of 100. grams of butane?

100. g C_4H_{10}				
				= _____ g O_2

18 How many grams of H_2O are produced when 5.38g of O_2 is reacted?

KEY

$$2\ KClO_3 \rightarrow 2\ KCl\ +\ 3\ O_2$$

1. How many moles of O_2 will be formed from 1.65 moles of $KClO_3$?

$$\frac{1.65\ mol\ KClO_3}{} \left| \frac{3\ mol\ O_2}{2\ mol\ KClO_3} \right| = \underline{2.48}\ mol\ O_2$$

2. How many moles of $KClO_3$ are needed to make 3.50 moles of KCl?

$$\frac{3.50\ mol\ KCl}{} \left| \frac{2\ mol\ KClO_3}{2\ mol\ KCl} \right| = \underline{3.50}\ mol\ KClO_3$$

3. How many moles of KCl will be formed from 2.73 moles of $KClO_3$?

$$\frac{2.73\ moles\ KClO_3}{} \left| \frac{2\ mol\ KCl}{2\ mol\ KClO_3} \right| = \underline{2.73}\ mol\ KCl$$

$$4\ Fe\ +\ 3\ O_2 \rightarrow 2\ Fe_2O_3$$

4. How many moles of Fe_2O_3 are produced when 0.275 moles of Fe are reacted?

$$\frac{0.275\ mol\ Fe}{} \left| \frac{2\ mol\ Fe_2O_3}{4\ mol\ Fe} \right| = \underline{0.138}\ mol\ Fe_2O_3$$

5. How many moles of Fe_2O_3 are produced when 31.0 moles of O_2 are reacted?

$$\frac{31.0\ mol\ O_2}{} \left| \frac{2\ mol\ Fe_2O_3}{3\ mol\ O_2} \right| = \underline{20.7}\ mol\ Fe_2O_3$$

6. How many moles of O_2 are needed to react with 8.9 moles of Fe?

$$\frac{8.9\ mol\ Fe}{} \left| \frac{3\ mol\ O_2}{4\ mol\ Fe} \right| = \underline{6.7}\ mol\ O_2$$

$$2\ H_2O \rightarrow 2\ H_2\ +\ O_2$$

7. How many moles of O_2 are produced when 1.26 moles of H_2O is reacted?

$$\frac{1.26\ mol\ H_2O}{} \left| \frac{1\ mol\ O_2}{2\ mol\ H_2O} \right| = \underline{.630}\ mol\ O_2$$

8. How many moles of H_2O are needed to produce 55.7 moles of H_2?

$$\frac{55.7\ mol\ H_2}{} \left| \frac{2\ mol\ H_2O}{2\ mol\ H_2} \right| = \underline{55.7}\ mol\ H_2O$$

9. If enough H_2O is reacted to produce 3.40 moles of H_2, then how may moles of O_2 must have been made? (a bit challenging, but just think about it and you can probably figure it out)

$$\frac{3.40\ mol\ H_2}{} \left| \frac{1\ mol\ O_2}{2\ mol\ H_2} \right| = \underline{1.70}\ mol\ O_2$$

$$2 \text{ KClO}_3 \rightarrow 2 \text{ KCl} + 3 \text{ O}_2$$

10. How many **grams** of O_2 will be formed from 3.76 grams of $KClO_3$?

3.76g $KClO_3$	1 mol $KClO_3$	3 mol O_2	32.00 g O_2	
	122.55 g $KClO_3$	2 mol $KClO_3$	1 mol O_2	= __1.47__ g O_2

11. How many **grams** of $KClO_3$ are needed to make 30.0 grams of KCl?

30.0 g KCl	1 mol KCl	2 mol $KClO_3$	122.55 g $KClO_3$	
	74.55 g KCl	2 mol KCl	1 mol $KClO_3$	= __49.3__ g $KClO_3$

12. How many grams of KCl will be formed from 2.73 g of $KClO_3$?

2.73 g $KClO_3$	1 mol KCl O_3	2 mol KCl	74.55 g	
	122.55 g $KClO_3$	2 mol KCl O_3	1 mol KCl	= __1.66__ g KCl

$$4 \text{ Fe} + 3 \text{ O}_2 \rightarrow 2 \text{ Fe}_2\text{O}_3$$

13. How many **grams** of Fe_2O_3 are produced when 42.7 **grams** of Fe is reacted?

42.7 g Fe	1 mole Fe	2 mol Fe_2O_3	159.70 g Fe_2O_3	
	55.85 g Fe	4 mol Fe	1 mol Fe_2O_3	= __61.0__ g Fe_2O_3

14. How many **grams** of Fe_2O_3 are produced when 17.0 grams of O_2 is reacted?

17.0 g O_2	1 mol O_2	2 mol Fe_2O_3	159.70 g Fe_2O_3	
	32.00 g O_2	3 mol O_2	1 mol Fe_2O_3	= __56.6__ g Fe_2O_3

15. How many grams of O_2 are needed to react with 125 grams of Fe?

125 g Fe	1 mol Fe	3 mol O_2	32.00 g O_2	
	55.85 g Fe	4 mol Fe	1 mol O_2	= __53.7__ g O_2

Some cars can use butane (C_4H_{10}) as fuel:
$$2 \text{ C}_4\text{H}_{10} + 13 \text{ O}_2 \rightarrow 8 \text{ CO}_2 + 10 \text{ H}_2\text{O}$$

16. How many grams of CO_2 are produced from the combustion of 100. grams of butane?

100. g C_4H_{10}	1 mol C_4H_{10}	8 mol CO_2	44.01 g CO_2	
	58.14 g C_4H_{10}	2 mol C_4H_{10}	1 mol CO_2	= __303__ g CO_2

17. How many grams of O_2 are needed to react with of 100. grams of butane?

100. g C_4H_{10}	1 mol C_4H_{10}	13 mol O_2	32.00 g O_2	
	58.14 g C_4H_{10}	2 mol C_4H_{10}	1 mol O_2	= __358__ g O_2

18 How many grams of H_2O are produced when 5.38g of O_2 is reacted?

5.38g O_2	1 mol O_2	10 mol H_2O	18.02 g H_2O	
	32.00 g O_2	13 mol O_2	1 mol H_2O	= __2.33__ g H_2O