

Stoichiometry

Example Balanced Equation

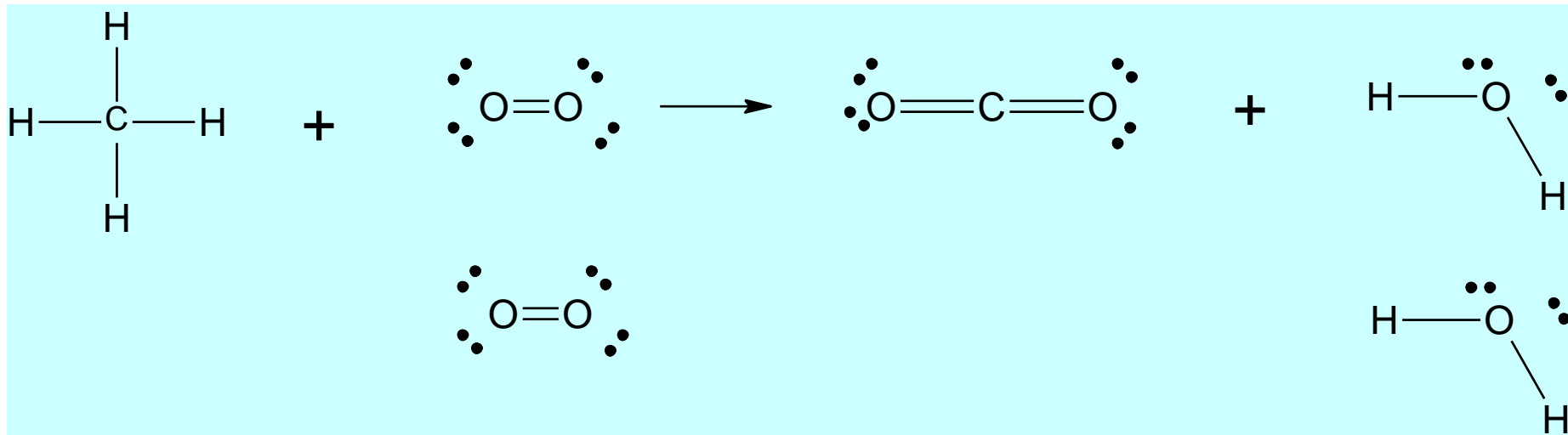
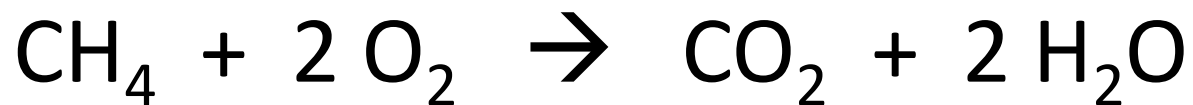


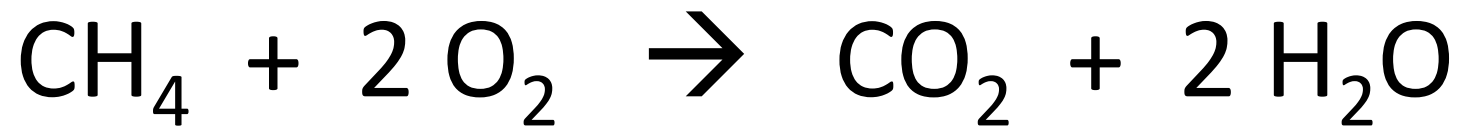
Example Balanced Equation



Balanced?

Example Balanced Equation





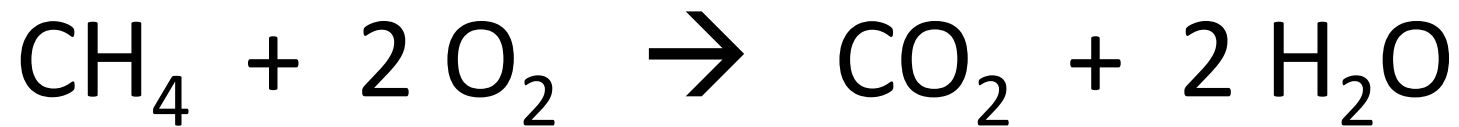
CH₄

O₂

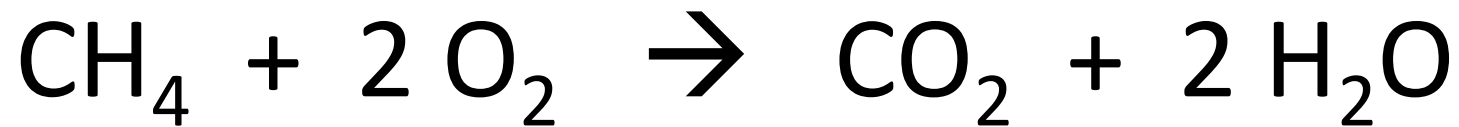
CO₂

H₂O

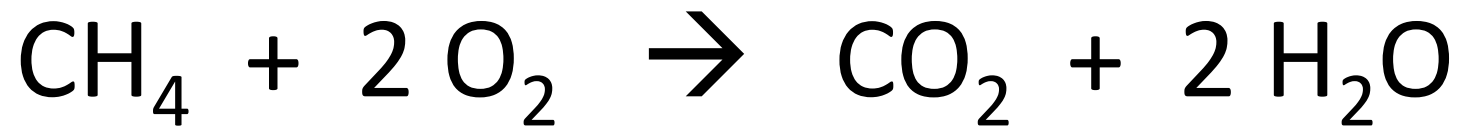
CH ₄	O ₂	CO ₂	H ₂ O



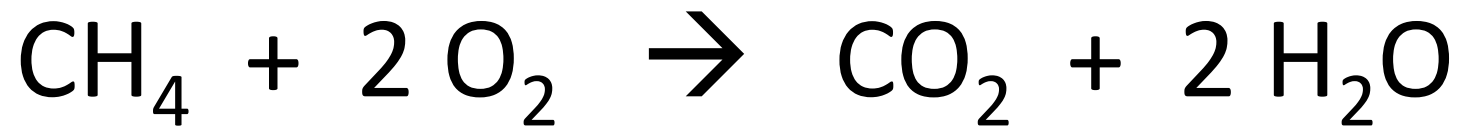
CH ₄	O ₂	CO ₂	H ₂ O
1 molecule			



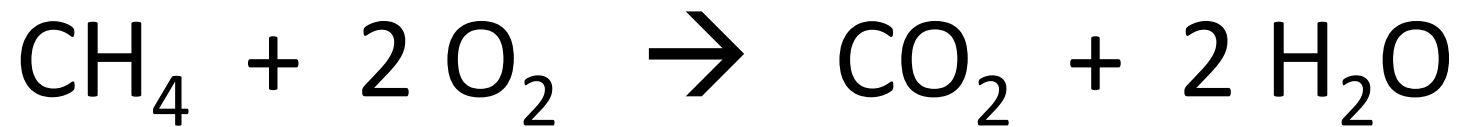
CH_4	O_2	CO_2	H_2O
1 molecule	2 molecules	1 molecule	2 molecules



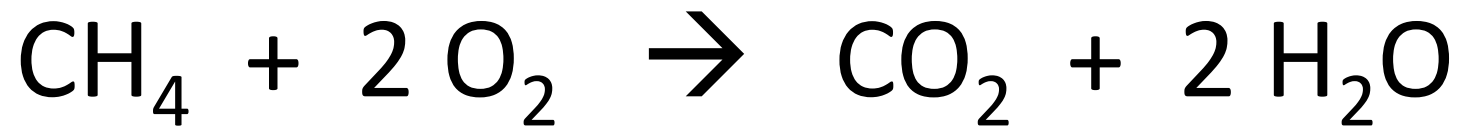
CH_4	O_2	CO_2	H_2O
1 molecule	2 molecules	1 molecule	2 molecules
10 molecules			



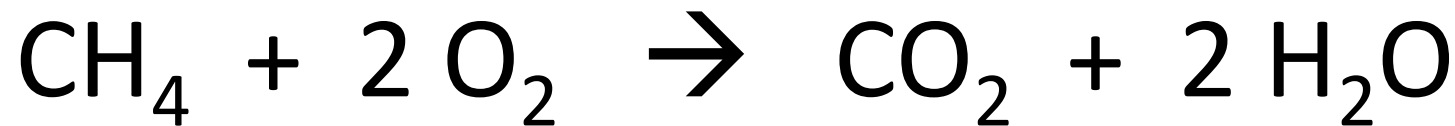
CH_4	O_2	CO_2	H_2O
1 molecule	2 molecules	1 molecule	2 molecules
10 molecules	20 molecules	10 molecules	20 molecules



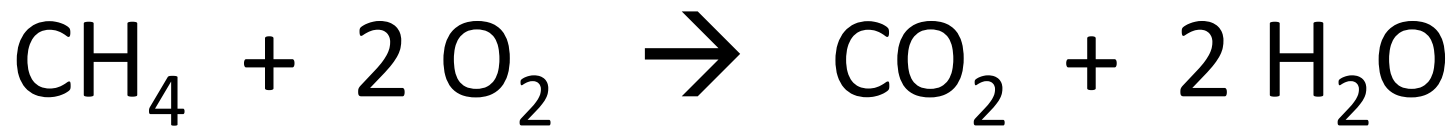
CH_4	O_2	CO_2	H_2O
1 molecule	2 molecules	1 molecule	2 molecules
10 molecules	20 molecules	10 molecules	20 molecules
1 dozen molecules			



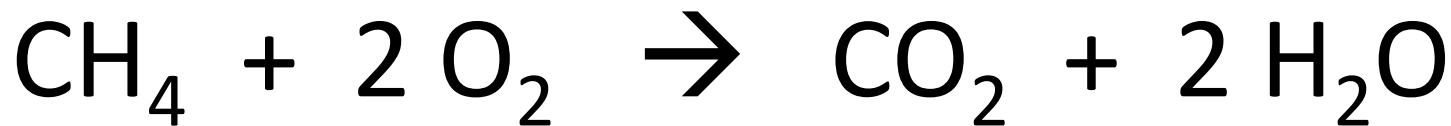
CH_4	O_2	CO_2	H_2O
1 molecule	2 molecules	1 molecule	2 molecules
10 molecules	20 molecules	10 molecules	20 molecules
1 dozen molecules	2 dozen molecules	1 dozen molecules	2 dozen molecules



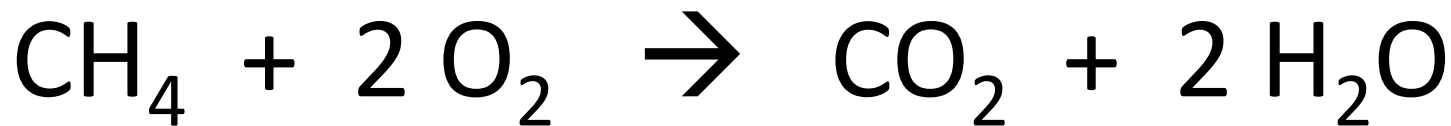
CH_4	O_2	CO_2	H_2O
1 molecule	2 molecules	1 molecule	2 molecules
10 molecules	20 molecules	10 molecules	20 molecules
1 dozen molecules	2 dozen molecules	1 dozen molecules	2 dozen molecules
1 mole			



CH_4	O_2	CO_2	H_2O
1 molecule	2 molecules	1 molecule	2 molecules
10 molecules	20 molecules	10 molecules	20 molecules
1 dozen molecules	2 dozen molecules	1 dozen molecules	2 dozen molecules
1 mole	2 moles	1 mole	2 moles



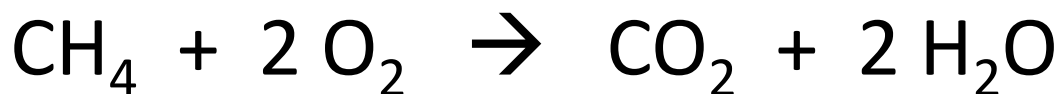
CH_4	O_2	CO_2	H_2O
1 molecule	2 molecules	1 molecule	2 molecules
10 molecules	20 molecules	10 molecules	20 molecules
1 dozen molecules	2 dozen molecules	1 dozen molecules	2 dozen molecules
1 mole	2 moles	1 mole	2 moles
16 grams			



CH_4	O_2	CO_2	H_2O
1 molecule	2 molecules	1 molecule	2 molecules
10 molecules	20 molecules	10 molecules	20 molecules
1 dozen molecules	2 dozen molecules	1 dozen molecules	2 dozen molecules
1 mole	2 moles	1 mole	2 moles
16 grams	64 grams	44 grams	36 grams

Sample Problem 1

If you want to burn 4.5 moles of methane, how many moles of oxygen would you need? How many moles of water and carbon dioxide would be produced?



~~4.5 moles CH₄~~

2 moles O₂

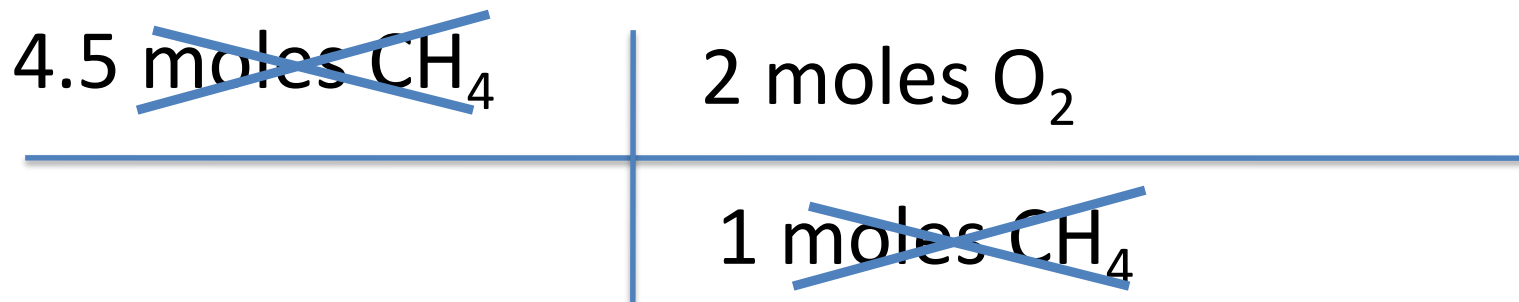
~~1 moles CH₄~~

Units Cancel

This conversion comes from the balanced equation

Sample Problem 1

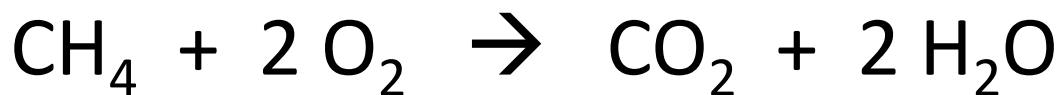
If you want to burn 4.5 moles of methane, how many moles of oxygen would you need? How many moles of water and carbon dioxide would be produced?



$$= 9.0 \text{ moles O}_2$$

Sample Problem 1

If you want to burn 4.5 moles of methane, how many moles of oxygen would you need? How many moles of water and carbon dioxide would be produced?



~~4.5 moles CH₄~~

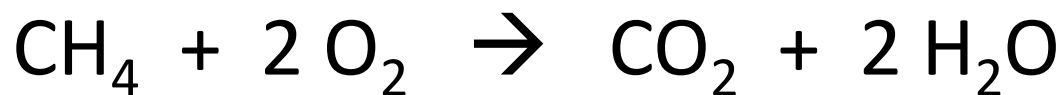
2 moles H₂O

~~1 moles CH₄~~

= 9.0 moles H₂O

Sample Problem 1

If you want to burn 4.5 moles of methane, how many moles of oxygen would you need? How many moles of water and carbon dioxide would be produced?



~~4.5 moles CH₄~~

1 mole CO₂

~~1 moles CH₄~~

= 4.5 moles CO₂

Sample Problem 2

Silver (I) chromate can be produced by the reaction of silver (I) nitrate with potassium chromate. How many moles of each reactant would you need in order to produce 0.3 moles of silver (I) chromate?

First Step:

Sample Problem 2

Silver (I) chromate can be produced by the reaction of silver (I) nitrate with potassium chromate. How many moles of each reactant would you need in order to produce 0.3 moles of silver (I) chromate?

First Step: **Write the Balanced Equation**

Sample Problem 2

Silver (I) chromate can be produced by the reaction of silver (I) nitrate with potassium chromate. How many moles of each reactant would you need in order to produce 0.3 moles of silver (I) chromate?

First Step: Write the Balanced Equation



Sample Problem 2

Silver (I) chromate can be produced by the reaction of silver (I) nitrate with potassium chromate. How many moles of each reactant would you need in order to produce 0.3 moles of silver (I) chromate?



~~0.3 moles Ag_2CrO_4~~

2 moles AgNO_3

~~1 moles Ag_2CrO_4~~

= 0.6 moles AgNO_3

Sample Problem 2

Silver (I) chromate can be produced by the reaction of silver (I) nitrate with potassium chromate. How many moles of each reactant would you need in order to produce 0.3 moles of silver (I) chromate?



~~0.3 moles Ag_2CrO_4~~

1 mole K_2CrO_4

~~1 moles Ag_2CrO_4~~

= 0.3 moles K_2CrO_4

Sample Problem 3

Burning hydrogen gas produces water. How many grams of water would be produced by the reaction of 15.0 g hydrogen with excess oxygen?

Step 1: Write the balanced equation.



Sample Problem 3

Burning hydrogen gas produces water. How many grams of water would be produced by the reaction of 15.0 g hydrogen with excess oxygen?



15.0 grams H₂	1 mole H₂	2 mole H₂O	18.01 grams H ₂ O
	2.02 grams H₂	2 mole H₂	1 mole H₂O

= 134 grams H₂O

Starting to get the hang of it?

You try sample problem 4 by yourself...

Follow the steps...

I'll give answers so you can check your work.

Sample Problem 4

A chemist has 23.5 g of copper (II) chloride and lots of aluminum foil. How many grams of each product can the chemist produce by reacting the copper (II) chloride with the aluminum foil?



Sample Problem 4 - Answers

A chemist has 23.5 g of copper (II) chloride and lots of aluminum foil. How many grams of each product can the chemist produce by reacting the copper (II) chloride with the aluminum foil?



15.5 g AlCl_3

11.1 g Cu

Sample Problem 4

A chemist has 23.5 g of copper (II) chloride and lots of aluminum foil. How many grams of each product can the chemist produce by reacting the copper (II) chloride with the aluminum foil?



23.5 grams CuCl₂	1 mole CuCl₂	2 mole AlCl₃	133.33 grams AlCl ₃
	134.45 g CuCl₂	3 mole CuCl₂	1 mole AlCl₃

= 15.5 grams AlCl₃

Sample Problem 4

A chemist has 23.5 g of copper (II) chloride and lots of aluminum foil. How many grams of each product can the chemist produce by reacting the copper (II) chloride with the aluminum foil?



23.5 grams CuCl₂	1 mole CuCl₂	3 moles Cu	63.55 grams Cu
	134.45 g CuCl₂	3 mole CuCl₂	1 mole Cu

= 11.1 grams Cu

Time to practice...

Work on Stoichiometry WS #1