

### Combustion

What are 3 requirements of combustion?

spark

fuel oxygen, O<sub>2</sub>

Jul 17-10:51 AM

### Balancing Combustion Reactions Complete or Incomplete?

Essential Standard:  
I can use mathematical representations to support the claim that atoms, and therefore mass, are conserved during a chemical reaction. NGSS HS-PS1-7

Learning Targets:

11. I can define a complete combustion reaction and predict the products.  
12. I can balance a combustion reaction.

<http://phet.colorado.edu/en/simulation/balancing-chemical-equations>

Sep 17-5:49 AM

Learning Target: I can define a complete combustion reaction

### Combustion reactions

two types

**Complete combustion:**  
(excess oxygen)

$$C_xH_yO_z + O_2 \rightarrow CO_2 + H_2O$$

**Incomplete combustion**  
(not enough oxygen)

$$C_xH_yO_z + O_2 \rightarrow CO + H_2O$$

↓  
deadly carbon monoxide !!

Hemoglobin Molecule

Jul 18-3:22 PM

Learning Target: I can balance a combustion reaction

### Balancing Reactions

Reactants → Products

total atoms before = total atoms after

M= M=  
F= F=

Law of Conservation of Matter  
↑  
"keep constant"

-matter cannot be created or destroyed  
-chemical equations must be balanced

Sep 17-4:26 AM

Learning Target: I can balance a combustion reaction

**Practice:**

- add or change **coefficients only** (not formulas, not subscripts)

Write the equation and draw the molecules

$$\text{CH}_4 + \text{O}_2 \longrightarrow \text{CO}_2 + \text{H}_2\text{O}$$

Sep 17-5:03 PM

Learning Target: I can balance a combustion reaction

**Balancing combustion reaction tips**

- Best order: C,H,O
- Look for oxygen everywhere. Save O<sub>2</sub> for last.
- Odd/even oxygen rule: double everything, then adjust O<sub>2</sub>
- Always recheck your work

$$\text{C}_4\text{H}_8 + \text{O}_2 \longrightarrow \text{CO}_2 + \text{H}_2\text{O}$$
  

$$\text{C}_2\text{H}_2 + \text{O}_2 \longrightarrow \text{CO}_2 + \text{H}_2\text{O}$$
  

$$\text{C}_2\text{H}_5\text{OH} + \text{O}_2 \longrightarrow \text{CO}_2 + \text{H}_2\text{O}$$

Sep 17-5:20 PM

Draw the structure of 2-methyl pentane.(Draw all hydrogens).

Write the molecular formula

Show the incomplete combustion reaction of 2-methyl pentane. Balance.

Sep 24-8:00 AM

Draw the structure of 2-methyl pentane.(Draw all hydrogens).

Write the molecular formula

$$\text{C}_6\text{H}_{14}$$

$2(6) + 2 = 14$

Show the incomplete combustion reaction of 2-methyl pentane. Balance.

$$2\text{C}_6\text{H}_{14} + 13\text{O}_2 \longrightarrow 12\text{CO} + 14\text{H}_2\text{O}$$

|                 |                               |
|-----------------|-------------------------------|
| 12              | 14                            |
| <del>2</del> CO | <del>7</del> H <sub>2</sub> O |
| 12x6 C = 72     | 14x2 H = 28                   |
| 28x14 H = 392   | 12x12 O = 144                 |
| 26x2 O = 52     | <del>14</del> 26              |

Sep 24-8:00 AM

## Attachments

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watch.webloc