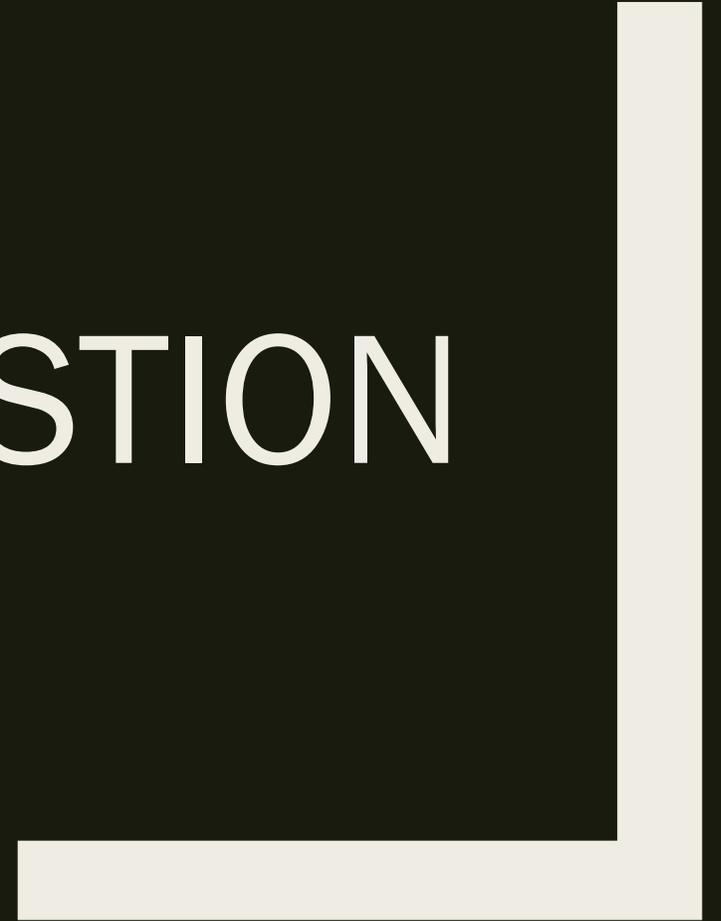


COMBUSTION



Combustion Reactions

A reaction that **releases** a large amount of **energy** in the form of **heat**.

All combustion reactions are **exothermic reactions**



Equation for combustion of octane
(main component in gasoline)



Oxidation

- A chemical change involving **oxygen**.
 - *Combustion is a form of **oxidation!***

How to recognize oxidation/combustion reactions

- Look for the presence of O_2 in the reactants

Other Oxidation/Combustion Reactions

Examples:

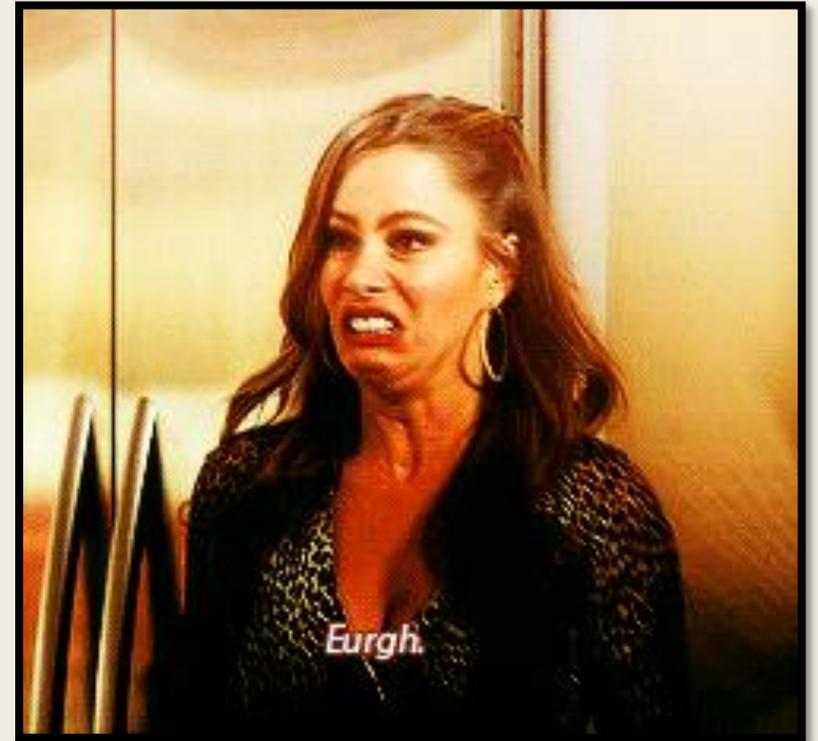
*Apple rotting/
browning*



Other Oxidation/Combustion Reactions

Examples:

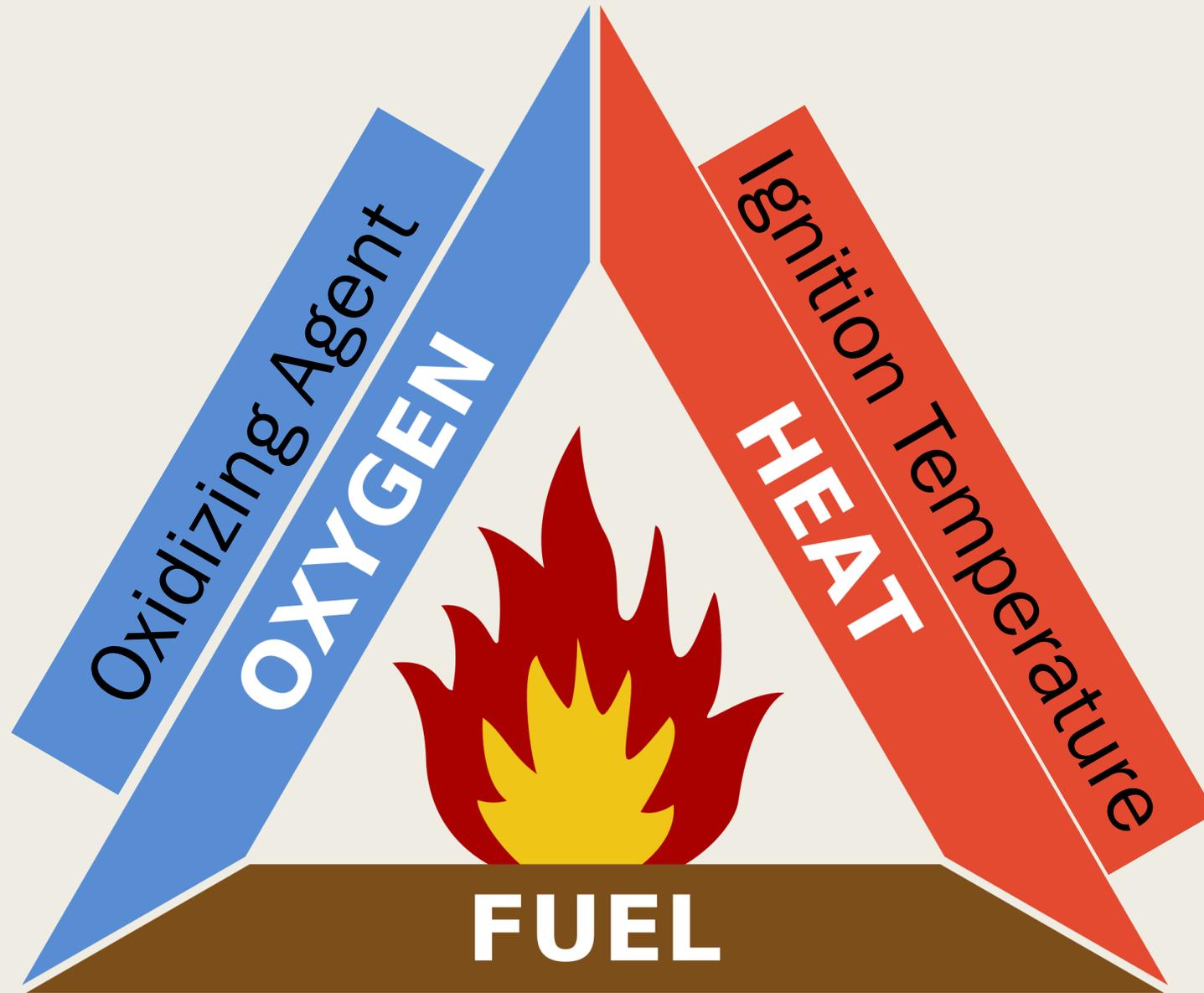
Rust



Combustion Reactions

For combustion to occur, three requirements must exist:

1. There must be an **oxidizing agent**
 - *something to cause the fuel to burn – oxygen is the most common*
2. There must be **fuel**
 - *what's burning*
3. The **ignition temperature** is surpassed
 - *minimum temperature for fuel to ignite*



Categories of Combustion Reactions

Three categories

- 1. Rapid combustion:** Occurs **quickly** once ignition temperature is reached.
- 2. Spontaneous combustion:** occurs **quickly** since ignition temperature is reached **without outside energy**. Often unpredictable.
- 3. Slow combustion:** occurs over **long period of time**; energy released is **less**.

Cellular Respiration

Form of **slow combustion**, and therefore a type of **exothermic reaction**

Chemical energy trapped in **glucose** is released and used for bodily functions



Photosynthesis

Opposite of Chemical Respiration, therefore is a **endothermic reaction**

Solar energy is **captured and stored** into chemical bonds, forming **glucose** (in **plants**)



Difference between Cellular Respiration and Photosynthesis

Cellular respiration is the **opposite** of photosynthesis

- Cellular respiration **consumes** glucose, and **releases energy**
- Photosynthesis **creates** glucose, and **absorbs energy**

Past Exam Questions

- A fire is extinguished by removing at least one of the three conditions required for combustion to occur. These conditions are indicated in the fire triangle below.

Table I -Functions of a CO₂ Extinguisher

	Function
1	The main function of the carbon dioxide (CO ₂) is to smother the fire by reducing the amount of oxygen gas (O ₂) that feeds it Oxidizing agent
2	In the very early stages of a fire, the CO ₂ has a cooling effect, since it comes out of the extinguisher at a temperature of -78°C. Ignition temperature
3	The gas comes out of the extinguisher as a powerful spray that puts out small paper fires by scattering the pieces of material involved. Fuel

- State the part of the fire triangle each descriptor is referring to