**Gasoline Combustion and Emisions**

**The gasoline powered internal combustion engine (in cars) takes in air from outside mixes it with gas and adds a spark to propel the vehicle.**

**Simple internal combustion:**

**Air + gas + Spark.**

**Only about 20 % of the energy released by the explosion in the piston is used to propel the car.**

**The remaining 80 % is lost to friction, accessory (like the radio), or lost to the cooling system.**

**Gas is a mixture long Hydrocarbons, which means that it is made of hydrogen and carbon.**

**The air that we breath and used to burn the gas is made of O2(21%), N2(78%) and other trace gases(1%) .**

**Since gas is a mixture of Hydro Carbons several reactions typically occur. The equations for gas combustion are:**

N2+ 2C8H18 + 25O2 -> 16CO2 + 18H20+N2   
N2+C9H20 + 14O2 -> 9CO2 + 10H20+N2   
N2+2C10H22 + 31O2 -> 20CO2 + 22H20 +N2  
N2+C11H24 + 17O2 -> 11CO2 + 12H20 +N2  
N2+2C6H6 + 15O2 -> 12CO2 + 6H20 +N2  
N2+C7H8 + 9O2 -> 7CO2 + 4H20 +N2  
N2+4C8H7 + 39O2 -> 32CO2 + 7H20 +N2  
N2+2C8H10 + 21O2 -> 16CO2 + 10H2O+N2

**When the gas isn’t completely burned cleanly some hydrocarbon emissions and nitrogen emissions come out of the exhaust as harmful pollution**.