Some anthropologists believe that the discoveries of fire, shelter, and language were almost simultaneous.

COMBUSTION

A fire started on some grasslands near a farm. The county fire department was called to put out the fire. The fire was more than the county fire department could handle. Someone suggested that a nearby volunteer group be called. Despite some doubt that the volunteer outfit would be of any assistance, the call was made.

The volunteers arrived in a dilapidated old fire truck. They rumbled straight towards the fire, drove right into the middle of the flames and stopped! The firemen jumped off the truck and frantically started spraying water in all directions. Soon they had snuffed out the center of the fire, breaking the blaze into two easily-controlled parts.

Watching all this, the farmer was so impressed with the volunteer fire department's work and was so grateful that his farm had been spared, that right there on the spot he presented the volunteers with a check for $1,000.

A local news reporter asked the volunteer fire captain what the department planned to do with the funds. "That ought to be obvious" he responded, wiping ashes off his coat. "The first thing we're gonna do is get the brakes fixed on our fire truck!"

Outline

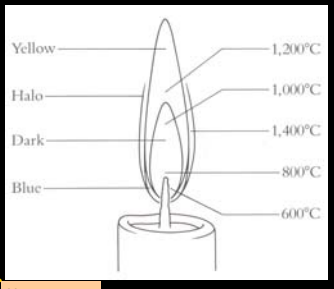
Date		Class #		Comb. Lecture	Problem Due
Nov	11		Concepts, Candle, Fireplace, Premixed, Diffusion	1	
	13	20	Heats of Formation, Heats of Reaction, Heat Capacities, Enthalpies	2	#1
	18	21	Stoichiometry, Equilibrium Constants Adiabatic Flame Temperature, Multi-Component	3	#2,#3
	20	22	Equilibrium, NASA-Lewis Code	4	#4
	27		BYU Friday, **NO Class**		
	29		**Thanksgiving**		
Dec	2	25	Heterogeneous Combustion	5	#5
	4	26	NO_x Mechanisms, Soot	6	#6
	9	27	Flame Speeds, Turbulence, Explosions	7	#7
	11	28	Review	8	#8

Pholgiston

- Early 1700's
- Unknown substance
- Involved in fire/combustion
- Prior to discovery of oxygen

The Candle Flame

A. Temperatures



Hottest areas

Figures from Fire, by J. W. Lyons (1985)

Energy Flow

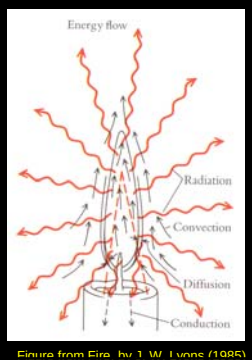


Figure from Fire, by J. W. Lyons (1985)

- 25% of energy lost to radiation
- 4% of radiation melts wax at top of candle
- Liquid wax moves up wick (capillary action)
- Wax vaporizes from wick
- Wax vapor cracks into smaller molecules
- Small hydrocarbon molecules combust at edge of flame

Colors

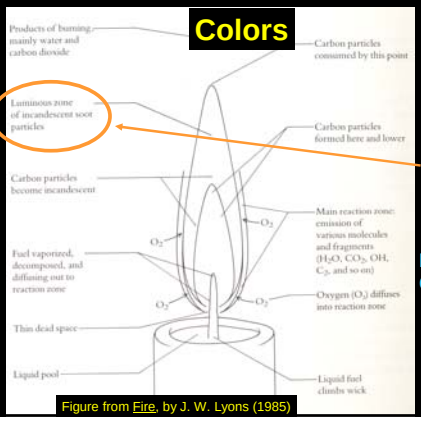


Figure from Fire, by J. W. Lyons (1985)

Yellow – Soot (hot solid)

Blue – CH_2 and CH