NOBCChE PRESENTERS: KIM COLLINS, PHD AND CELIA OCHOA

SATURDAY, OCTOBER 3RD, 2020

1:30 PM TO 2:00 PM

CELEBRATE SCIENCE INDIANA™

A program of the Science Education Foundation of Indiana.

NOBCChE℠

National Organization for the Professional Advancement of Black Chemists and Chemical Engineers

LET'S LEARN ABOUT CHEMICAL REACTIONS: BOUNCY EGG!

MATERIALS: RAW EGG, WHITE VINEGAR, CONTAINER

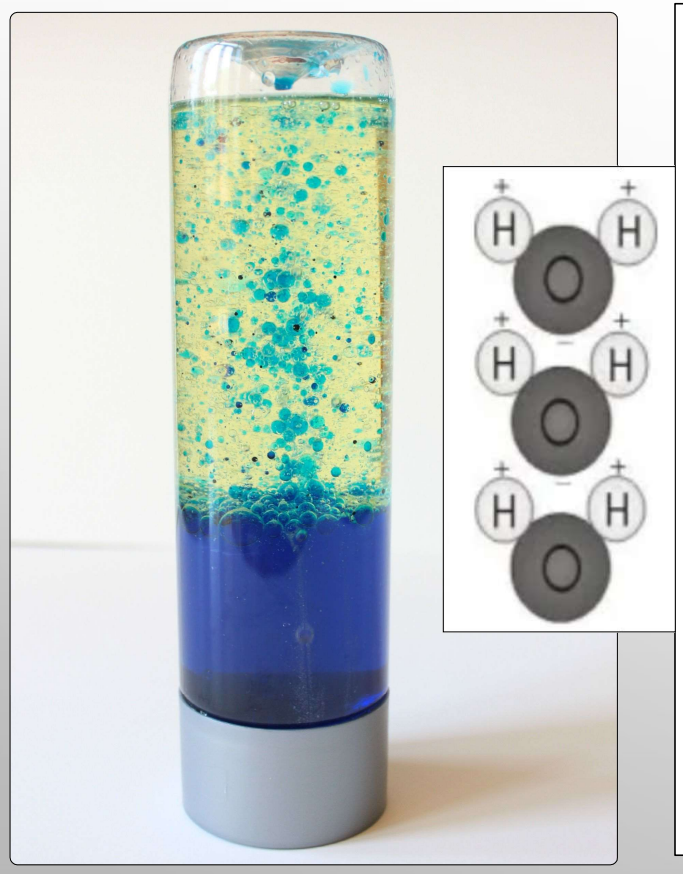
HOW DOES THE EGG BECOME BOUNCY?

$$2\ CH_3COOH + CaCO_3 = H_2O + CO_2 + Ca(CH_3COO)_2$$

ACETIC ACID + CALCIUM CARBONATE = WATER + CARBON DIOXIDE + CALCIUM ACETATE

A chemical reaction occurs between the eggshell and vinegar. The eggshell is made up of calcium carbonate and vinegar is a weak acid, as a result the chemical reaction causes the eggshell to dissolve. When the calcium carbonate and vinegar react, small bubbles can be observed. These small bubbles are carbon dioxide gas as a result of the chemical reaction.

LET'S LEARN ABOUT DENSITY + POLARITY: LAVA LAMP!



Materials: Plastic Bottle, Water, Food Coloring, Vegetable Oil, Fizz Tablet (Alka-Seltzer)

Density: how much of a substance fits in a certain space,

density = mass/volume

Density Of Water: 1 g/cm^3

Density Of Vegetable Oil: 0.917-0.925 g/cm^3 @ 20C

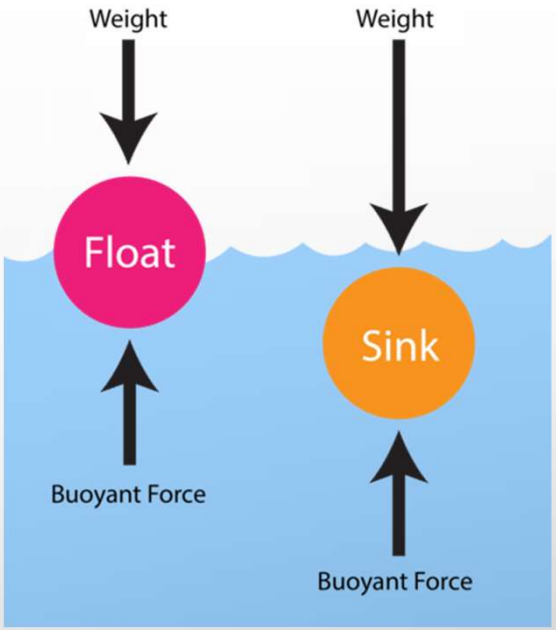
Water and oil do not mix! "like dissolves like"

Water is polar (has +/- charge) and oil is non-polar (does not like water).

Dropping Alka-Seltzer causes carbon dioxide gas bubbles to form, water/gas mix is less dense than water, so they rise.

LIQUID DENSITY AND BUOYANCY

MATERIAL	DENSITY (g/cm^3 or g/mL)
Rubbing alcohol	0.79
Lamp oil (refined kerosene)	0.81
Baby oil	0.83
Vegetable oil	0.92
Ice cube	0.92
Water	1.00
Milk	1.03
Dawn dish soap	1.06
Light corn syrup	1.33
Maple Syrup	1.37
Honey	1.42



MATERIALS: liquids of different densities (i.e. syrup, dish soap, water, oil), food coloring, bottle or clear container, various solid objects (small rock, paperclip, foam, penny, etc.)

EXPERIMENT LINKS

- BOUNCY EGG: HTTPS://COOLSCIENCEEXPERIMENTSHQ.COM/BOUNCY-EGG/

HTTPS://WWW.SCIENCEOFCOOKING.COM/EGGS/NAKED-EGG-EXPERIMENT.HTML#:~:TEXT=WHEN%20CALCIUM%20CARBONATE%20COMES%20IN,CH3CO2H)%20A%20CHEMICAL%20REACTION%20OCCURS.&TEXT=2%20CH3COOH%20%2B%20CACO3%20%3D%20H2CO3%20%2B,%2C%20H2CO3%20%3D%20H2O%20%2B%20CO2

- LAVA LAMP: HTTPS://WWW.HOMESCIENCETOOLS.COM/ARTICLE/HOW-TO-MAKE-A-HOMEMADE-LAVA-LAMP-SCIENCE-PROJECT/
- DENSITY COLUMN: HTTPS://SPARKONIT.COM/2015/11/21/DENSITY-SCIENCE-EXPERIMENT-POUR-WATER-OIL-SYRUP-GLASS-SEE-HAPPENS/

HTTPS://WWW.HOMESCIENCETOOLS.COM/ARTICLE/LIQUID-DENSITY-PROJECT/

- COMBUSTION REACTION: HTTPS://WWW.WATTPAD.COM/489888015-HAND-SANITIZER-AND-FIRE-TRICKS-MAKE-A-BLUE-FIRE

Do NOT try the following at home without parental supervision

COMBUSTION REACTION

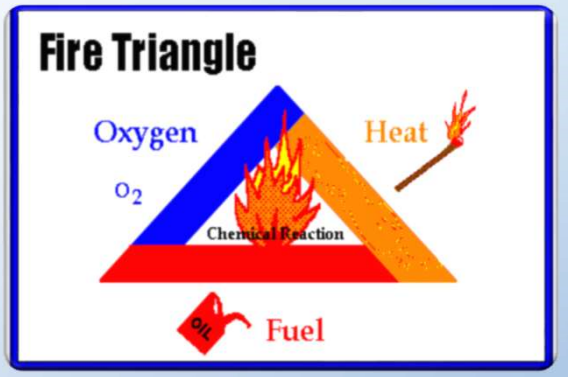
FIRST, FIRE SAFETY !

DO NOT TRY THIS AT HOME WITHOUT PARENTAL SUPERVISION

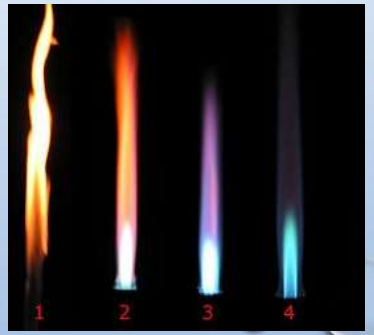
ALWAYS HAVE A FIRE EXTINGUISHER (OR WATER) NEARBY!

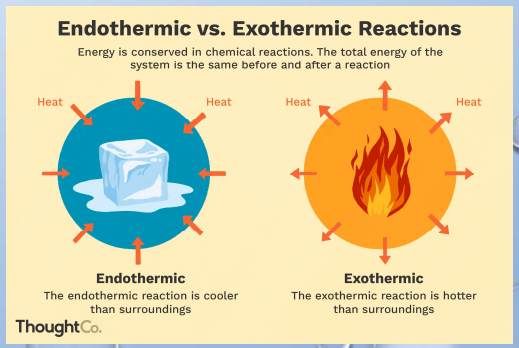
Four things must be present at the same time in order to produce fire:

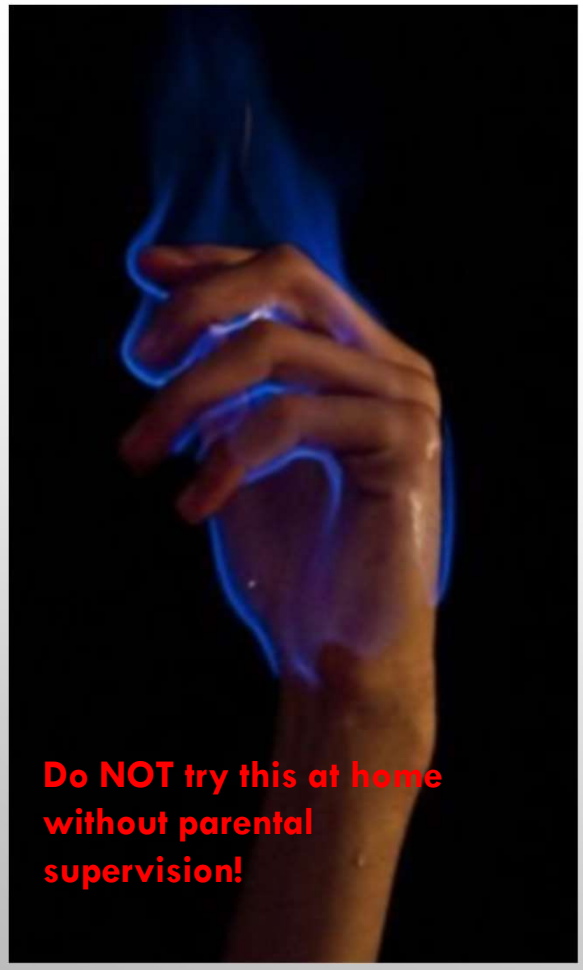
- Enough oxygen to sustain combustion,
- Enough heat to raise the material to its ignition temperature,
- Some sort of fuel or combustible material, and
- The chemical, exothermic reaction that is fire.



Spectral Type	Color	Surface temperature (K)
O	Blue	> 33000
B	Blue-white	33000 - 10000
A	White	10000-7500
F	Yellow-white	7500 - 6000
G	Yellow	6000 - 5200
K	Orange	5200 - 3700
M	Red	< 3700







What is in hand sanitizer?

Mostly water – diluent

>65% alcohol – antibacterial component, active ingredient

Glycerol – gives the sanitizer a gel-like consistency and hydrating element

$$C_2H_6O + 3O_2 \longrightarrow 3H_2O + 2CO_2$$

ethanol + oxygen ⟶ water + carbon dioxide

Why do our hands not burn?

Water has a high specific capacity (amount of heat needed to raise a substance's temperature), so very high temperature is needed to boil water. The water protects us from getting burnt.