

Before
lighting anything
Remove all
flammables
from area

Program

Prairie Star Elementary Ms. 8:30 – 10:00 AM Thursday, January 24th

Tile Square Fire *tile + Boric Acid to Methanol* Tate

Burning Dollar *50% Methanol (50ml) + 50% water* Jenn
(over tile)

Bubbles and Dry Ice (kids) and Universal Indicator.
..... Shivani and Hannah *Water + Univ indic + dry ice ...
add soap*

Strawberry float. *Bag Alconox 300ml H₂O* Maia
(do in tube) *Bag NaHCO₃ + 10-20ml Methyl orange* } *should be orange + HCl*

Balloon and Bernoulli's principle Andrew
Blower, funnel + balloon

Acetone and Styrofoam Shivani
acetone + Styrofoam cup + plastic petri dish

Methanol Bomb Max

*Methanol in bottle - coat - drain all out - whoosh in air
connect Sproopula to one clip and light w Tesla on other*
Al-Fe Balls Andrew *in arm*

Luminol demo Jen and Hannah
funnel + Luminol + peroxide → collect in Beaker

Light Bulb and Tesla Max and Andrew

Cartesian diver Maia

Salt Demo Jenn and Hannah
salts CuCl₂, BaCl₂, KCl, LiCl, SrCl₂, NaCl

Whoosh Bottle Tate

*Coat inside to Methanol, drain rest,
add air; light.*

Tile Square fire: Methanol burns Blue and boric acid burns Yellow. When they burn together the flame is Green and they form a compound called an ester. Esters are substances that have a strong smell like perfumes, bananas, spearmint.

Acetone and Styrofoam: Acetone disrupts the bonding in the polystyrene cup causing it to liquefy by dissolving it. If it is allowed to set and dry out it will harden and be in the form that we see which makes up plastic forks and spoons.

Bernoulli's Principle: As the velocity of a fluid (air) increases, the pressure exerted by that fluid (air) decreases. This is how airplanes get their lift and race cars keep their rear tires on the ground.

Burning Dollar: The combustion reaction between ethanol and water produces heat that is not high enough to evaporate the water. The dollar is also made of a substance that is more like fabric than paper.

Bubbles and Dry Ice: Dry ice as you know is carbon dioxide and this gas is heavier than oxygen and nitrogen which is in our atmosphere. The bubbles capture the carbon dioxide, and that is why you see smoke when you break the bubbles. Carbon dioxide is found in fire extinguishers because it will keep the oxygen away from the fire and snuff it out.

Universal Indicator: Acids are substances that are sour in taste (like a lemon) and release Hydrogen ions. They make a solution turn red. Bases are bitter in taste and can make a solution turn all the way to purple. Dry ice is frozen carbon dioxide, the same gas you breathe out. In water, the frozen dry ice turns into carbon dioxide gas which causes bubbles and reacts with water to become a weak acid. If we add a base like ammonia, we can change the solution to become neutral or go back to basic again.

Cartesian diver: This is a demonstration on density. Air is less dense than water. The eyedropper in the bottle has an air bubble in it. As we apply pressure on the outer bottle it affects the water inside the bottle and more water goes into the eyedropper making it more dense so that it will sink. When we let up on the pressure water comes out of the eyedropper and the air will increase in the eyedropper making it float or rise. This is what takes place in submarines but in a little different manner.

Egg in Bottle: Hot air expands the molecules; when air cools down, it lowers the air pressure and the greater air pressure on the outside pushes the egg into the bottle.

Methanol Bomb: Electricity ignites methanol and oxygen forming heat from combustion. This reaction speeds up air molecules trapped in the bottle,

producing pressure on the sides in the bottle that is so great it has to escape. This pressure pushes the cork out.

Al-Fe Balls: When aluminum and iron(III) oxide (rust) come together they react and form molten iron and aluminum oxide. The spark is molten iron.

Luminol: when a mixture containing a substance called luminol and several other compounds such as sodium carbonate, baking soda, ammonium carbonate, and copper sulfate is mixed with hydrogen peroxide a chemical reaction occurs causing light to be emitted. This reaction is similar to what takes place when fireflies light up during a summer evening.

Light Bulb and Tesla: Electrons move from the tesla coil through people through the light bulb.

Salt Demo: Metals in the salts contain different numbers of electrons in their outer energy levels. When they heat up, the electrons jump to higher energy levels but it depends on the electrons of the metal (some get more energy than others and jump higher). When the electrons return to their ground level, they release energy in the form of visible light. The colors you see equal the energy the electrons gained. Red is the least amount of energy and purple (violet) is the most.

Strawberry Float: The baking soda reacts with the hydrochloric acid, a strong acid, and produces sodium chloride which is table salt, water and carbon dioxide gas. The orange color at the beginning is from a substance called methyl orange. Methyl orange is an acid-base indicator that turns red in a strong acid and is orange in a weak acid solution. The soap bubbles contain the carbon dioxide gas which is the same gas you exhale.

Whoosh Bottle: The alcohol burns in such a high rate that it creates a rocket engine effect with pressure being released in a large way.

H₂ Bomb: When magnesium mixes with an acid, it produces flammable hydrogen gas.

Flaming Pumpkin: Lycopodium powder is very fine with a large surface area. It is pollen and therefore contains carbon and hydrogen atoms that are combustible in oxygen. With the heat of the candle's flame they will burn.

Other demos

Can Implosion: By boiling the water in the can you decrease the amount of air molecules and those present will expand to fill the can (more energy). The

minute you cool off the molecules, the air pressure is high and pushes on the sides of the can.

Iodine Clock: When three colorless solutions are combined in a large beaker or other container and stirred together with a magnetic stirrer, the solution becomes amber, then blue-black, then colorless and continues to repeat this series of changes for the next few minutes. The first set of changes occurs with a period of about 15 seconds when the solutions are at 25 degrees Celsius and the period of oscillation gradually increases. After several minutes, the blue-black color persists.

Pencils and Bag: The plastic bag is made out of a long chain called polymers. This gives the bag it stretchy properties. The sharp pencils slip between the molecule strands without tearing the bag. The long molecule chains seal around the pencil keeping it from leaking.

0 gravity cup: The water does not spill out of the cup since both the water and the cup are moving accelerating at the speed of gravity and the water essentially becomes weightless and stays in the cup.

Elephant Toothpaste: Hydrogen Peroxide is a molecule that contains 2 Hydrogens and 2 Oxygens. It is used to kill bacteria when you scrape your knee or get a cut. Potassium iodide is a catalyst. A catalyst speeds up the breakdown of hydrogen peroxide into water and oxygen. The soap bubbles in this demonstration contain oxygen. The stream you see means heat is given off. Oxygen is necessary to keep a fire burning and that is why it can relight the splint.