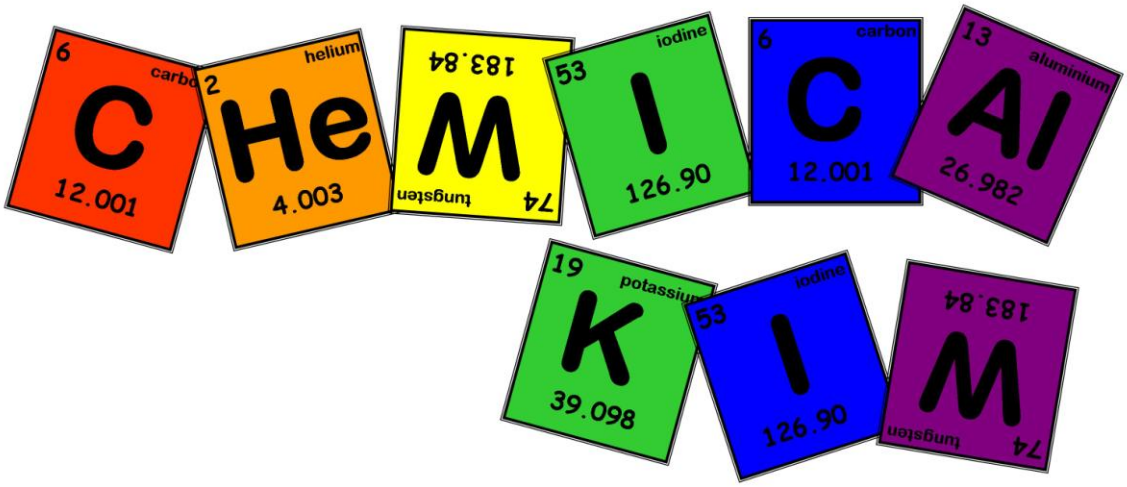

FUN SCIENCE ACTIVITIES FOR KIDS!!

CAPTURING A GAS

This is a very easy and fun kitchen chemistry experiment, mixing baking soda and vinegar. Any guesses as to gas being produced? Give it a try, it's all good and safe!

Items needed:

baking soda (sodium bicarbonate), vinegar (5% acetic acid), measuring utensils, container with small mouth (pop bottle works), funnel, balloon

Now try this:

1. Place the funnel into the balloon and add a scoop of baking soda.
2. Add vinegar to the container (pop bottle).
3. Carefully place the balloon over the mouth of the container. Make sure the baking soda does not fall into the vinegar.
4. Once the balloon is completely sealed around the mouth of the container, lift the balloon to add all of the baking soda into the vinegar. For extra security use your hand to hold the balloon around the mouth of the container.
5. Observe the gas that is collected in the balloon.

Explanation:

Baking soda is a compound called sodium bicarbonate. Vinegar is a solution containing a compound called acetic acid. Sodium bicarbonate and acetic acid react producing a gas called carbon dioxide. This is a common gas that we produce when we exhale.

For video & further instructions visit: www.chemicalkim.com

CHEMICAL KIM'S FAVORITE CONCOTION… SLIME!

Everyone is always looking for the best slime recipe. Well, this is it! Here is a substance that behaves as both a solid and a liquid and is great fun to play with. Enjoy!

Items needed:
1 containers (cups or bowls), stirring device (spoon), water, liquid starch (found with laundry items often called Sta-flo, 12 Mule laundry product mixed in water can be substituted), glue (school type), food coloring (optional)

Now try this:

1. Place glue into a container and add an equal amount of water and mix well. For a change in color, add food coloring.
2. Add the liquid starch and mix just a few times. Allow mixture to rest for at least five minutes (very important).
3. Mix again, this time extremely well. Allow the mixture to rest for five minutes again.
4. Place this amazing concoction in your hands. It is a bit like slime or silly putty. See how it stretches. Make it into a ball.
5. How would you describe your new concoction? Is it a solid or is it a liquid?

Explanation:
This concoction is commonly referred to as slime. I put it into the category of slime or silly putty. It is a substance that can not clearly be classified as a solid or a liquid because it has properties of both. Like a solid this substance can be made into a ball and you can break it apart. Like a liquid it will hold the shape of a container and it will pour (very slowly).

For video & further instructions visit: www.chemicalkim.com

A LESSON ON DENSITY: MAKING A LAVA LAMP

Utilizing the physical properties of oil, water, and salt you can make your very own lava lamp.

Items needed:
tall glass or vase, water, vegetable oil, salt, food coloring (optional)

Now try this:

1. Fill a jar ½ filled with water.
2. Add ½ to 1 cup vegetable oil. Observe.
3. Add a few drops food coloring. Observe. Then mix and observe.
4. In teaspoon amounts add salt. Observe.
5. When salt has settled on bottom of jar, place a golf ball into the jar. Allow to sit for at least an hour. Observe.

Explanation:

Oil is less dense than water so it will settle on top. Adding food coloring will initially show it settles on the oil mixing shows it won't mix with the oil but with the water. Salt is a solid and when it's place into the jar, the sugar will fall to the bottom of the jar because it's density is greater than both the oil and the water. When the salt falls it will take some oil to the bottom of the jar but because of oil's density, it will rise back above the water (thus the lava lamp affect). Setting the golf ball into the jar and allowing the entire mixture to sit for at least an hour allows time for the salt and water to mix, raising the density of the water and thus causing the golf ball to float in the salt water.

For video & further instructions visit: www.chemicalkim.com

Mentos in Pop!

If you want to do explosive but safe chemistry, this is the activity to try!

Items needed:

2-L bottle of pop (diet cola works great), 8-12 mentos candies, Plastic tube to hold 8-12 mentos (you can also wrap paper and make a tube)

Now try this:

1. Place 8-12 Mentos candies into a plastic tube.
2. DO THIS OUTSIDE. Place 2-L bottle of pop on the ground and carefully remove the top.
3. Carefully (but quickly) place the plastic tube on top of the 2-L bottle of pop and deliver the Mentos.
4. Run really fast or stay and get sprayed by the pop.

Explanation:

The pop is a water solution that contains a gas called carbon dioxide. When you open the bottle of pop you can see the evidence of this gas as tiny bubbles going to the surface. The gas is put into water under pressure, opening the bottle lowers the pressure, thus releases some of the gas. When the Mentos candies are dropped into the pop the surface tension of the water is lowered, reducing the strength to contain the gas. Mentos also provides this gas small areas (called nucleation sites) on the candy to escape out of the water solution. This gas attracts other gases in the pop solution causing a great big eruption. What's surprising about this eruption is that it is not a chemical reaction, just a physical change because the gas was already there in the pop.

For video & further instructions visit: www.chemicalkim.com

Turn Ice into Ghost Crystals

Common materials you can purchase at a plant store are water gel crystals. These crystals are made out of a super-absorbent polymer called polyacrylamide. When this polymer absorbs water it looks like ice. See what happens when you place these absorbed crystals into water.

Items needed:

water gel crystals (polyacrylamide – found and most garden centers), water, several containers, food coloring, needle and thread, a nail, toothpick or wire.

Now try this:

1. Prepare the ice: Place a teaspoon of the crystals for every quart of water. Add food coloring to the water if you'd like to color the ice.
2. Allow crystals to sit in water, you will see expansion right away but for complete growth it will take take 1-8 hours. Warm water will speed up the process.
3. Remove the crystals from any remaining water and observe how they're expanded. Place a few crystals back into the water and it will look like they disappear.
4. Taking a needle and thread, nail, or wire, toothpick, or thread through a few crystals. Place this into the water and it will look like the tread, nail, toothpick, or wire is magically suspended in the water.
5. There are several things you can do with your ice. One suggestion is to make a column of different colored ice.
6. Placing the crystals into soil you will have a self watering system for several weeks for any plants.

Explanation:

Water gel crystals are made of a super-absorbing polymer called polyacrylamide that can absorb many hundreds of times their own weight. They are utilized to keeping plants watered because when placed in soil they are constantly expanding and contracting when absorbing and releasing water. These crystals look a lot like ice, perhaps because they are made mostly of water. When these crystals are placed in water they disappear because their index of refraction is almost the same as water.

For video & further instructions visit: www.chemicalkim.com

Science Poppers!!

Utilizing the chemical change that takes place between baking soda and vinegar you can have a lot of fun making your own science poppers.

Items needed:

baking soda, vinegar, water, toilet paper, containers with removable tops (such as film canisters or m&m tubes).

Now try this:

1. Wear safety glasses.
2. Place a small amount (1/4 teaspoon) of baking soda into a piece of toilet paper and wrap into a small ball.
3. Fill the container about half way with vinegar (~10 mL)
4. Quickly drop the toilet paper into the container and place the top on.
5. Stand back and in less then 10 seconds? POP!!!

Explanation:

When you combine baking soda (sodium bicarbonate) with vinegar (acetic acid) a chemical reaction takes place. This is evident by the bubbling that you see. This bubbling is a gas that is released called carbon dioxide. As the carbon dioxide gas is being produced pressure is building inside the container. Eventually enough pressure builds up resulting in the top popping off!!

For video & further instructions visit: www.chemicalkim.com

Balloon Science Tricks

Utilizing air pressure, static electricity, and the properties of polymers, here are a few very fun science tricks you can do to amaze your friends!

Items needed:
balloons, Styrofoam balls, wood skewer, vegetable oil 2-L plastic bottle, glass soda bottle

Now try this:

1. Locate the two areas on a balloon that have the greatest amount of latex (the area the balloon is tied and the area directly across). Dip a wood skewer into the oil and pierce the balloon through these two locations on the balloon. You have success if the balloon doesn't pop.
2. Rub a balloon on your head or on a piece of wool. Lift balloon off your head or place it on a wall. Also place the balloon near small Styrofoam balls. You have success when the balloon causes your hair or the Styrofoam balls to "stick" or repel or "stick" to the wall. Also try placing the balloon near a small stream of water and you will see the water "bend".
3. Pierce a hole in the bottom of a clean, dry 2-L plastic bottle. Place a balloon into the bottle and seal it around the rim of the bottle. Cover the hole with your hand and attempt to inflate the balloon in the bottle (you won't be able to). Then uncover the hole and inflate the balloon in the bottle (you will be able to).
4. Carefully place a small amount of hot water into a glass soda bottle. Seal a balloon around the rim of the bottle. Now place the bottle with the balloon attached into a cold water bath (water and ice). As the water (and air) inside the bottle cools, the balloon will "magically" be sucked into the bottle.

Explanation:
The balloon can be pierced without popping by utilizing the properties and behaviors of the latex (polymers-large molecules). Picking the areas that contain the most latex (the least amount of stretching occurs) allows for the skewer to pass with out "tearing" the molecules apart, these molecules that are linked together. The oil has an attraction for these latex polymers. When you rub a balloon on your head or on a piece of wool you are giving the balloon an electric charge (putting electrons on the balloon). Different objects have an attraction or repulsion for this now charged balloon. You cannot inflate a balloon inside a bottle that is sealed because of the air in the bottle causing air pressure. Having a hole in the bottle removes the air, thus removes the air pressure.
Cooling the air inside a bottle causes the air molecules (gases) to decrease in volume, thus causing the balloon to be sucked into the bottle.

For video & further instructions visit: www.chemicalkim.com

Ivory Soap Science

Thanks to an error that took place in a laboratory of Proctor and Gamble in 1890, Ivory soap has unique properties allowing for some fun science activities!

Items needed:
Ivory soap, another brand soap, paper plate, microwave, two glasses of water, Ivory dish soap, food coloring, tooth pick, Elmer's glue, clear lid, cream (or whole milk), bowl.

Now try this:

1. Place a bar of ivory soap into one glass of water and another brand of soap into another glass of water. Observe how Ivory soap will float and the other soap does not.
2. Place a bar of Ivory soap onto a paper plate. Put the plate with soap into the microwave and turn it on for ~2 minutes, watching carefully. Turn off the microwave and remove when the soap has "erupted".
3. Place enough Elmer's white glue onto a clear lid to cover the lid completely. Add a few drops of food coloring do the glue (do not mix). Dip a toothpick into the Ivory dish soap and carefully touch the spots of food coloring. Observe the amazing movement of the color. (This also works with milk instead of glue).
4. Repeat step 3 using cream (or whole milk) in a bowl instead of glue.

Explanation:
The error that took place in the laboratory of Proctor and Gamble in 1890 was a mixing machine that was mistakenly left on too long, causing a lot of air to get trapped inside the soap (the soap was "fluffed"). Because of this error, Ivory soap was found to float, a wonderful physical property for bath takers that lose their soap to the bottom of the tub. The added air made Ivory soap less dense than water. Therefore, when you put Ivory soap in the microwave, the air inside heats up, causing the soap to expand. This expansion causes the Ivory soap to "erupt".
Glue (and milk) contains large molecules that are weakly bonded. They are also substances made primarily of water. When food coloring is added (also made primarily of water), not much mixing takes place, the food coloring looks like it stays where the drops were placed. Adding a small amount of Ivory dish soap breaks the weak bonds of the large molecules and breaks water's surface tension. Instantly food coloring mixes for an amazing show of movement.

For video & further instructions visit: www.chemicalkim.com

BristleBots!

What to do with an old pager or cell phone? Take out the motor that causes it to vibrate and make a very fun, very simple robot!

Items needed:

pager or cell phone motor (you can also find these motors in electronics & parts stores), watch battery, brush (from tooth brush), two-sided tape

Now try this:

1. Cut off the brush from a toothbrush.
2. Take pager or cell phone motor and identify (or add) small copper leads to the motor terminals.
3. Apply two-sided tape to the back of the brush and the motor (leaving enough space for rotating weight to vibrate and not hit the brush).
4. Attach the copper leads from the motor terminals to the small battery and attach the battery to the two-sided tape so it also is attached to the back of the brush. This turns on the robot and it is now ready to move.
5. Place the moving brush into a tray and watch the fun (you may try placing objects in the tray to allow the brush to move them, maybe even paint).
6. To turn off the motor just remove one of the copper leads on the battery.

Explanation:
A robot is an automatically guided machine that can do tasks on its own. This simple robot moves very quickly around a confined space, such as a tray. The rotating weight on the motor is what caused the pager or cell phone to vibrate. Attaching this motor to a brush is enough to vibrate and causes propulsion to the brush on the tray.

For video & further instructions visit: www.chemicalkim.com

"Melting" Packing Peanuts!

So you just received that shipment of parts to build your new robot and it's packed amongst hundreds of little foamy pieces that look like peanuts. These are packing peanuts of course and your science mind starts wondering... what could I do with all these packing peanuts? “Melt” them of course!!

Items needed:
safety glasses, starch-based packing peanuts, polystyrene packing peanuts, water, acetone (found at hardware store), glass jars.

Now try this:

1. Place about 200 mL of acetone and 200 mL of water separately into two glass jars.
2. Place the starch-based packing peanuts into the water and observe the "melting".
3. Place the polystyrene packing peanuts into the acetone and observe the "melting".
4. Try placing the starch-based packing peanuts into the acetone and the polystyrene packing peanuts into the water... do you observe "melting"?

Explanation:
The "melting" you are observing is actually dissolving. Many substances dissolve easily in water (thus water is called the "universal solvent"). Starch-based packing peanuts easily dissolve in water as you observe in this activity. Polystyrene packing peanuts do not dissolve in water so another solvent is utilized called acetone. Also as observed the starch-based packing peanuts do not dissolve in the solvent acetone.
The unique application of the activity illustrates the usefulness in creating starch-based packing peanuts. These are peanuts that water can easily dissolve and are environmentally more friendly than polystyrene. You could further investigate the strengths between these two peanuts and their masses (or weights) as to whether there are benefits to using either type of peanut.
An additional application of the activity is to compare the polystyrene behavior in acetone to that of a toy product called "Plastic Bubbles".

For video & further instructions visit: www.chemicalkim.com

See Your Name In Chemical Lights!!

Here is a fun science activity that let's everyone know you're a science superstar!!

Items needed:
black light, clear plastic tubing (aquarium-type), fluorescent materials such as whitening laundry detergent, club soda (tonic water), highlighter markers, antifreeze, water, glue gun.

Now try this:

1. Fill a clear plastic tube with a liquefied fluorescent material.
2. Seal the tubing with a glue gun.
3. Shape the tubing into a design, maybe spelling your name!
4. Turn on the black light and see your amazing creation glow, looking just like your own neon sign!!
5. Place other items under black light and see if they “glow”.

Explanation:
Black light emits energy in the near ultraviolet (UV) light range with very small emission of visible light as compared to a normal light that emits mostly in the visible light range. Many materials in our world contain what are called phosphors. Phosphors are materials that emit visible light (glow) when exposed to a black light. Fluorescent materials are phosphors that absorb the invisible UV light given off by a black light and emit visible light as different emission colors. The plastic tubing in this activity does contain phosphors but adding materials such as laundry detergents or highlighter marker colors dissolved in water the tubing emits even greater amounts of visible lights in differing colors.

For video & further instructions visit: www.chemicalkim.com

Handy Dandy Conductivity Meter

Here is a very fun and very easy kitchen chemistry activity for testing the conductivity of common chemicals in your home.

You will need:
popsicle stick, Christmas lights, 9V battery, wire strippers, tape, aluminum foil, water, salt, sugar, and other household chemicals.

Now try this:

1. Cut off a single Christmas light from an old Christmas light set and strip the coating to expose its two wires.
2. Cover the top edge of a 9V battery with tape to insulate the metal by the terminals, keeping the terminals exposed.
3. Attach one wire from the Christmas light to the positive terminal on the 9V battery and secure it with tape
4. Make 2 aluminum foil "wires" by rolling foil into long tubes.
5. Secure the first aluminum wire to the negative terminal of the 9V battery with tape.
6. Secure the second aluminum wire to the other wire from the Christmas light with tape.
7. Tape all of this to the popsicle stick, leaving the aluminum wires parallel but not touching.
8. You now have your conductivity meter to test different solutions

Explanation:

Placing the conductivity meter into different solutions can result in having the Christmas light to light up or to stay unlit or to dim. This is the result of either having ions in solution or not having ions in solution. Ions are positively charged atoms (that have a gain or loss of electrons). Two chemical compound types common in your home, when put in water, will put ions in solution. These compounds are ionic compounds and acid compounds. Salt is a common ionic compound and when put into water the NaCl separates into Na+ and Cl- ions which allow electrons to pass in the water completing a circuit making the light to glow. Very fun and very cool.

For video & further instructions visit: www.chemicalkim.com

Electrolysis of Water

Here is a very fun and easy activity using pencils to separate hydrogen and oxygen from water.

Items needed:

Water, 9V battery, two pencils sharpened on all sides, electrical wire, salt

Now try this:

1. Connect one electrical wire to the positive side of the battery and connect another electrical wire negative side of the battery.
2. Now connect the other ends of the wire to the graphite (the "lead" of the pencil) on the two pencils, one wire to each graphite.
3. Place the other exposed graphite of the pencils into the water.
4. Add salt to the water and make your observations to the bubbles being formed on the graphite. You're making hydrogen and oxygen gas!

Explanation:

By placing the two graphite ends of the pencils into the water you are placing electrodes into the water because they are connected to the positive
and negative terminals of a battery. The electrical current generated from the battery (electricity) is passed through the water from one electrode to another. In this process water (H_2O of course) separates into hydrogen and oxygen. This is a process known as electrolysis.

For video & further instructions visit: www.chemicalkim.com

"Melting" Science Snow

There is a common polymer used to make fake snow that is used in special effects and decorating. Water is added to this polymer to "swell" or stretch the polymer making material that really looks like snow. Add a little salt to the fake snow and see if it actually "melts" like fake snow too!

You will need:
Instant Snow (also called Grow Snow or Fake Snow, now found at many toy stores) - contains sodium polyacrylate, water, and salt.

Now try this:

1. Very simply add water and observe the polymer "absorb" the water. You can make this snow to your desired wetness (dry or slushy snow).
2. Food coloring can be added for colored snow.
3. Sprinkle salt on the snow and see what happens.

Explanation:
Sodium polyacrylate is superabsorbent polymer and absorbs the water by a process called osmosis. During osmosis the water molecules pass through the large polymer molecule that is sodium polyacrylate, causing the polymer to stretch and swell to a very large size.
You can observe the physical change that takes place by letting the water evaporate and the sodium polyacrylate will return to it's original size.
Adding salt appears to "melt" the snow but what is actually happening is the salt breaks the polymer chain and so the water is no absorbed by the polymer.
Have fun by food coloring to the water, does that change the color of the fake snow? What happens if you use warm vs. cold water?

For video & further instructions visit: www.chemicalkim.com

Hydrophobic Sand

It's sand that is afraid of water!! Incredible!! You may have seen sand sold in toy stores called 'Magic Sand' and when you put it into water it never gets wet! Well here is a fun and easy science activity that show you how to make you own Hydrophobic Sand (Magic Sand).

Items needed:

safety glasses, sand (colored crafting sand works really good), metal cake pan, oven, water proofing spray (Scotch Guard).

Now try this:

1. Spread a cup of sand onto a metal cake pan, making an even layer of sand.
2. Place the sand into the oven set at 200 degrees for 1 hour to remove any moisture still contained in the sand.
3. Allow the sand to cool completely to room temperature.
4. With safety glasses and the assistance of an adult, spray the sand with an even coat of water proofing spray. Make sure your work area is covered with old newspaper or some protective covering to protect surfaces of over spray.
5. Allow any volatile gases to evaporate off the sand by shaking the sand occasionally for 10-15 minutes. Allow complete drying (approximately one hour). You've made your own Hydrophobic Sand!
6. Slowly pour the Hydrophobic Sand into water and observe its behavior!

Explanation:

Hydrophobic sand is sand that repels water; there are many common materials in our world that are hydrophobic. Oils, fats, greasy materials, many leaves on trees are all hydrophobic and are near impossible to wet. Their molecular structure resists attraction to the water molecule.
Chemists have been able to utilize the behaviors of hydrophobic molecules to make synthetic hydrophobic compounds that we find in water proofing sprays. These sprays are used to water proof our outdoor wear such as boots or coats. They're also put onto our carpets and upholstery to make spills easier to clean up. Normally these materials (boots, coats, carpets, upholstery, and in this activity sand) have an attraction to water (this is known as being hydrophilic). The spray coats these materials with hydrophobic molecules making that barrier between water.

For video & further instructions visit: www.chemicalkim.com

Chemical Bath Bombs!

Utilizing the chemical reaction of citric acid and baking soda make a fun and safe bath bomb!

Items needed:

mixing bowl, dropper, bowl of water, 1/4 cup of citric acid, 1/2 cups of baking soda, 1/4 cup of cornstarch, 2 tbsp. sea salt, 2 tbsp. Epsom salt, Dropper amounts of equal mixture of oil, fragrance, water

Now try this:

1. Make a dry mixture by combining the citric acid, baking soda, corn starch, and salts in a mixing bowl.
2. Add dropper amounts of the mixture of oil, fragrance, water to the dry mixture until it holds it's shape.
3. Create molds of the mixture and allow drying for several hours.
4. To test your chemical bath bombs drop them into water and see the fun and amazing chemical reaction! Turning bath time into a fun science experiment!

Explanation:

Citric acid in water makes and acidic environment in which in combination with baking soda (sodium bicarbonate) a chemical reaction takes place. The evidence of a chemical reaction is the gas that is released when the chemical bath bomb is put into water. The gas that is released is carbon dioxide. Citric acid is a fruit acid. You can utilize other acid sources such as ascorbic acid from Vitamin C.

For video & further instructions visit: www.chemicalkim.com

Chemical Lightsticks!

Seeing all the ghost and goblins trick or treating this Halloween I noticed many of them wearing a chemical reaction around their necks. That chemical reaction is a lightstick.

Items needed:

safety glasses, lightsticks, two clear glass containers, work gloves, heavy duty cutters

Now try this:

1. Wearing safety glasses and work gloves, carefully cut the top of lightstick.
2. Pour into glass container, the liquid inside the lightstick.
3. Carefully remove the glass tube inside the lightstick. Carefully break this glass open while wearing work gloves. Pour out liquid into the other glass container.
4. Turn off the lights and combine the two liquids by pouring one liquid into the other.
5. For a greater glow collect liquids from several lightsticks.

Explanation:

Inside the lightstick contains two liquids that when mixed energy is released in the form of light. This light is called chemiluminescence. Liquid 1 contains diphenyl oxalate containing a fluorescent dye and the liquid 2 contains a solution of hydrogen peroxide. The color of the fluorescent dye is what provides the different colors of light emitted. When the two liquids mix a chemical reaction takes place that excites the electrons in the fluorescent dye. The behavior of these excited electrons is what releases energy in the form of light.

As a safety note: the chemicals in the lightsticks are irritants, not poisons. Therefore if kids do have contact with the liquids they are to rinse thoroughly with water. If ingested it's important to rinse as much out as possible and follow up with poison control just for precautionary measure. As with all chemicals, adult supervision is a must. Proper clothing and eye protection will assist to minimize harmful exposure.

For video & further instructions visit: www.chemicalkim.com