Make a Bouncy Ball

Before starting: If needed, make a new batch of Borax Solution. Pour 4 tablespoons hot water and 1 teaspoon borax powder into the cup labeled 'Borax Solution'. Stir till all the borax is dissolved.

1. Pour 1 tablespoon of clear glue into a paper snack tray. Add 4 drops food coloring and mix.
2. Sprinkle 1/2 teaspoon of borax solution *all over* your glue. DON'T STIR!
3. Sprinkle 1 tablespoon of cornstarch all over the glue / borax solution. DON'T STIR YET!!
4. Count to 15 seconds. Then use a stick to stir it together till fully mixed.
5. Once the mixture becomes impossible to stir, spread a little cornstarch on your palms, pick up the goo.
6. Knead the ball by rolling it around in your palms like play-dough. It's a sticky mess at first. Keep rolling till it starts to feel like a ball. (If it's still really sticky, sprinkle on just a little cornstarch and keep rolling.)
7. Once it's solidified, play with it. Bounce it.
8. When you're done playing with it, put it in a Baggie to take home – write name on the baggie!

What's happening: the glue makes the ball strong. The cornstarch makes it bouncy. The borax helps the cornstarch and glue stick together.

What's happening (For grown-ups): The glue contains polyvinyl acetate, a strong and flexible polymer that gives the ball strength. Cornstarch contains amylopectin, a polymer whose shape is best described as 'branched' - it sticks out like the branches of a tree - and gives the ball the property of elasticity. Elasticity allows the ball to return to its original shape after being compressed or stretched, such as hitting the floor. So instead of splattering everywhere, the ball bounces back up. The borax is needed to help the glue and the starch stick together. This connects the two polymers into a netlike formation, keeping the ball from crumbling or becoming slime when it is bounced.

Oil and Water

1. Pour a *small* amount of oil in one tube. Pour a *small* amount of water in another tube.
2. Put one drop of red or yellow food coloring in the water. What happens?
3. Put one drop of red or yellow food coloring in the oil. What happens?
4. Mix a drop of blue food coloring into the oil.
5. Pour water and the oil together. What happens?
6. Put the lid on the tube. Shake up mixture. What happens?
7. Let it sit. What happens?

What's happening? Water and oil don't mix. The red and yellow are water-based colors so they won't mix with the oil. The blue food color will bond with the oil. When you mix the oil and water, then let them separate, the oil floats to the top, because it is less dense than water.

Chromatography – What colors are really in that marker?

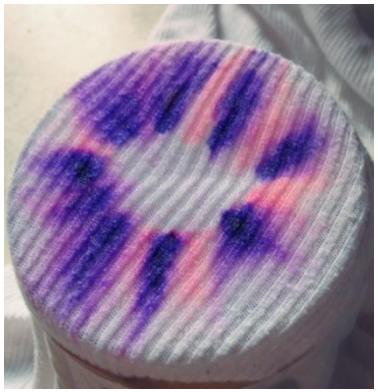
1. Use a marker to draw a line 1 – 2 inches from the end of a paper towel strip.
2. Dip the very end of the strip (below the line) into the water.
3. Lay the rest of the strip out on the tray.
4. Watch the water wick up and pull color along with it.
5. What colors do you see?

The Science: So, is black ink really just black? No! There's a rainbow of color hiding in just one black dot! The burst of color you see on the filter paper proves black is really a combination of colors. Chromatography is the science of separating mixtures. The black ink is actually made up of lots of different colors, and each different color is a different chemical substance. As the water soaks through the paper the ink on the paper moves.

Sharpie Tie-Dye

1. Color coffee filter with Sharpie.
2. Use pipette / eye dropper to drip on <u>just a little</u> rubbing alcohol. The colors will spread out.






Sharpies are hydrophobic or "water-fearing." They do not dissolve in water. However, they will dissolve in rubbing alcohol. So, when you drip rubbing alcohol on them, it picks up some of the ink molecules and carries them along as it spreads across the filter.

Milk "Fireworks"

1. Pour a shallow layer of milk in the dish.
2. Put a dot of one food color, then another color, nearby but not touching.
3. Dip Q-tip in detergent.
4. Touch soapy Q-tip to the surface of the milk. Hold it still. DON'T STIR!!
5. Watch what happens.



What's happening (grown-ups): Milk contains tiny suspended droplets of fat. Detergent weakens the chemical bonds that hold the fats in solution. The soap molecule's hydrophilic (water-loving), end dissolves in water, and its hydrophobic (water-fearing) end attaches to a fat globule in the milk. As the soap molecules race around joining up with the fat molecules, the fat molecules bent, roll, and twist in all directions. The food coloring lets us see this process. As the soap becomes evenly mixed with the milk, the action slows down and eventually stops. Add another drop of soap to start the process again. [source: Steve Spangler Science]

Marbled Paper

1. Write your name on a piece of paper
2. VERY CAREFULLY – lay the piece of paper on top of your milky fireworks so it floats there.
3. Lift it up carefully by one corner, then lay it colored side up on the table – see your fireworks captured on paper!
4. You can do two or three pieces of marbled paper from one set of milk fireworks.
5. Move paper to drying rack to dry so you can take it home.



Kool-Aid Solution

1. Put the kool-aid powder in the water, but DON'T STIR!!
2. Use your straw to drink just a little water from near the top of the cup.
3. Then use your straw to drink a little from the bottom of the cup, where the kool-aid powder is. Does it taste the same as your first drink? How does it taste?
4. Use your straw to stir the kool-aid till all the powder dissolves. Drink some more. How does it taste now?