**LAXTEX BOUNCY BALL**

**INTRODUCTION:**

Liquid latex is made up of very small globules of polymer hydrocarbons suspended in an aqueous solution. Proteins and other chemicals are present in the solution to keep the polymer globules from coming together to form one solid mass. Ammonia is added to stabilize this solution. The pH of the solution changes when the ammonia is neutralized by the addition of vinegar (4–8% acetic acid) and the globules of suspended latex begin to “join together” to form one large polymer mass of rubber.

Like plastic, rubber is a polymer, which is a chain of repeating units called monomers. In rubber, the monomer is a carbon compound called isoprene that has two carbon-carbon double bonds. As the latex dries, the isoprene molecules crowd together and one isoprene molecule attacks a carbon-carbon double bond of a neighboring molecule. One of the double bonds breaks, and the electrons rearrange to form a bond between the two isoprene molecules.

The process continues until you have a long strands of many isoprene molecules linked like a chain. These long strands are called polyisoprene polymer. Each polyisoprene molecule contains thousands of isoprene monomers. As the drying continues, the polyisoprene strands stick together by forming electrostatic bonds, much like the attraction between opposite poles of two bar magnets. The attraction between these strands holds the rubber fibers together and allows them to stretch and to recover.

**PROCEDURES:**

***\* Put on goggles. If you have any allergy to latex, do not handle any of the materials.***

1. Use a 50-mL beaker to measure out 15 mL of latex. Stick your finger into the latex to feel its texture. Wash your hands immediately.

2. Use a clean graduated cylinder to measure out 15 mL of water (tap water is fine). Pour it into the beaker containing the latex. Stir the mixture with a wooden stick.

3. Use a clean graduated cylinder to measure out 15 mL of vinegar. Add it to the beaker containing the water/ latex mixture while stirring.

4. Remove the stick from the beaker with the polymer lump attached, and place it in the large beaker ½ full of water.

5. Under the water, gently pull the lump of rubber off the stick. Keeping the rubber under water in the beaker of water, a black tub half full of water, or under a running faucet and squeeze the lump into a ball and then squeeze several more times to remove any unused chemicals. Be careful as the bubbles formed will pop and release materials.

6. Remove the ball from the water and squeeze it dry. Drop it on the floor and observe its properties.

7. Pour out any excess liquids from the beakers, scrap out any remaining latex, and put back all supplies.

**ANALYSIS QUESTIONS:**

1. What is latex?

2. What occurred when water was added and stirred into the latex?

3. What occurred when vinegar was added to the latex/water mixture? Explain why this occurs in 2-3 sentences. (See the Introduction.)

4. Based on your observations, the introduction, and further research how are the monomers of the latex reacting to create a polymer ball? Explain by **create a model** that demonstrates what is happening to the latex on a molecular level as it is combining with water and vinegar to form a ball.

5. Did your ball bounce straight up and down when it was released? Why are why not?

6. How could the uneven surface of the ball be resolved if the ball did not bounce straight up and down when released?