Slime Lab

Everyone has a feeling about how slime should act; of course, it should be slimey! It should stick togther and drip, but it should not come apart. So there should be something about slime that keeps it stuck together, but still allows it to move and sag. The principle of slime is in the cross-linking, or connecting, of molecules that are long "chains" to begin with. Gelatin (the stuff used to make Jello) is a good example of a long chain molecule. In this case, the cross-linking agent is heating/dissolving in water, followed by cooling.

Another useful long chain is Poly Vinyl Acetate, contained in conventional "white glue" or "Elmer's" glue. In this case, a chemical additive - simple, supermarket-style "Borax" (sodium tetraborate decahydrate, Na2B4O7.10H2O) - serves as the cross-linking agent. And again, water is entrapped, or suspended within the matrix of cross-linked Poly Vinyl Acetate molecules.

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**Terms: carbon**  
*Definition:*An element with the unique ability to form many compounds, largely because it can form four covalent bonds as well as chains and ring-shaped groups  
*Context:*Carbon is found in more than two million compounds.

**covalent bond**   
*Definition:*A bond between two or more nonmetals in which two atoms share electrons  
*Context:*Carbon has the property of being able to form four covalent bonds, meaning that all four of its electrons can bond with other elements.

**hydrocarbon**   
*Definition:*Compounds containing only hydrogen and carbon  
*Context:*Two types of hydrocarbons are natural gas and petroleum, materials formed from the remains of living things found deep within Earth.

**monomer**   
*Definition:*Subunits that form polymers, or long chains of molecules  
*Context:*Most polymers are made of the same kind of monomer that is repeated in a pattern.

**polymer**   
*Definition:*A large complicated molecule formed when chemical bonds link monomers in a pattern  
*Context:*Natural polymers include cellulose and the silk in spider webs; plastic and fiberglass are synthetic polymers.

Slim Lab Materials and Equipment

* Zip-lock baggie
* water
* Elmer's white school glue
* Borax (also called 20-Mule Team household cleaner)
* Graduated cylinders and scale
* two plastic cups

Experimental Procedure

1. First you will need to prepare solution #1, the 50% glue solution, which is made up of half glue and half water.
2. Add one 30ml of glue and 30ml of water to one of the cups.
3. Stir until glue is fully diluted, and no gooey clumps remain.
4. Label this beaker "Solution #1: 50% Glue".
5. Next, you will make solution #2, the Borax solution, which is made up of 4% Borax in water. Usually you would weigh the borax, but you can approximate this solution by adding 4 grams of Borax to 100ml of warm water in a cup.
6. Stir until no particles of Borax remain, and the solution is clear.
7. Label this cup "Solution #2: 4% Borax".
8. Now we will add Solution #1 and Solution #2 together in different ratios, to see what properties the final mixture will have. Use data table to record information:

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| **Solution #1** | **Solution #2** | **Observations** | **Physical Properties** |
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1. For each mixture decide what ratio you want to try, record, then measure the correct amount of Solution #1 (50% Glue) and put in the Zip-lock baggie.
2. Then add the corresponding amount of Solution #2 (4% Borax) to the baggie.
3. Seal the baggie, and using your fingers squish the mixture around to mix together the ingredients.
4. Write down your observations in your data table.
5. When the mixture begins to form a sticky glob, you can take it out of the baggie, put on plate or towel, and clean out bag for next mixture.
6. Write down your description of the physical properties of the material in your table. Remember to use words like runny, slimy, sticky, hard, soft, bouncy, etc�

**🡪Which ratio of ingredients produced the best product?**