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Chemistry 4400
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Elementary School Experiment

Polymer Play Creation

The purpose of this experiment is to gain an understanding of the various possibilities of polymer reactions and the importance of different ratios in chemistry. A polymer is a molecular structural unit that has many similar properties linked together, typically in a chain-like fashion. It can be thought of as many small cut strips of paper linked together to make a holiday garland. Polymers exist in nature as rubber, starch, and cellulose in plants. Polymers have become an essential molecule for many things in our everyday lives such as clothing, car parts, swimming pool, and playground equipment. They can also be used to make fun things, such as playful putty. It is essential to keep proper ratios of materials in mind to that the links are similar.

Supply List:

One Gallon Ziplock bag 2 cups of water Elmer's school glue
kids disposable gloves marker Borax protective cover for work surface
measuring cups and spoons 2 plastic gatorade bottles with lids funnel

Procedure:

- 1- Label one glass jar with the permanent marker " Glue" and label the other jar, " Borax".
- 2- Put on disposable gloves for safety purposes.
- 3- In the glass jar labeled "glue", combine one cup of the Elmer's glue with one cup of water. With the lid on tight, shake until there are no more clumps of glue.

- 4- In the second jar, labeled “Borax”, mix 3 tablespoons of Borax with one cup of lukewarm water. With the lid on tight, shake the mixture until there are no clumps.
- 5-In the ziplock bag, follow the ratio chart of the two mixtures.
- 6- After each addition, close the bag tightly and knead the mixture together with your fingers.
- 7- Record your observations on the chart after each ratio addition.
- 8-Once the mixture becomes easy to handle and forms into a ball, it can be removed from the bag and excess water can be dumped. Record observations about it’s physical properties. Is your creation lumpy, smooth, sticky, hard, soft, or is it rubber-like as polymers can be in nature?

Ratio and Observation Chart:

Borax mixture	Glue Mixture	Observations	Physical change
1 Tablespoon	3 Tablespoon		
2 Tablespoons	2 Tablespoons		
3 Tablespoons	1 Tablespoon		
5 Tablespoons	1 Tablespoon		

Questions:

1- Which mixture worked best for the final creation?

2- Why do you think that particular mixture worked best for your play putty?

3-Why do you think it is important for the water to be warm for the Borax mixture?

4- What did you learn from this experiment?

Notes: do NOT throw left over mixtures down the sink, rather please place in the trash can to avoid clogs.