

Student Name: _____

Date: _____

Activity Sheet

Glued into Science- Classifying Polymers

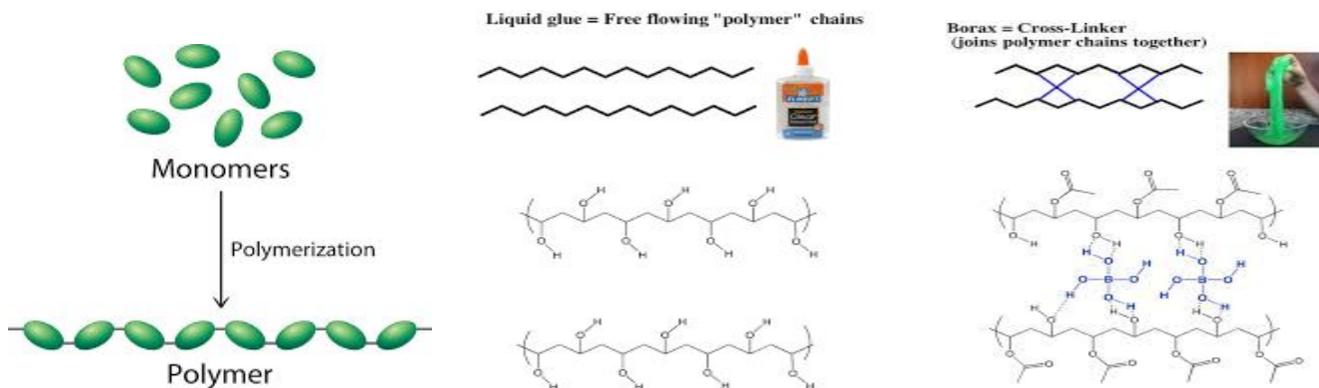
Background:

The solution of school glue with borax and water produces a putty-like material that's elastic and flows very slowly. The glue is actually made of a polymer material. In simplest terms, a **polymer** is a long chain of identical, repeating molecules. You can use the image of tiny steel chains to understand why this polymer behaves the way it does. Each link in a chain is a molecule in the polymer and one link is identical to another. When the chains are in a pile and you reach in to grab one, that's what you get: one. If you dump them on the floor, they're not connected to each other so they spread out everywhere like water. The strands flow over each other like the liquid glue in the bowl. Something caused a change, however....

Let's say you toss a few trillion tiny, round magnets into the pile of steel chains. Now when you reach in to grab one strand, you grab hundreds because the magnets have linked the strands together. If the molecules stick together at a few places along the strand, then the strands are connected to each other and the substance behaves more like a solid. Sodium tetraborate is the chemical in Borax that hooked together the polymers in the glue to form the putty-like material. This process is called **cross-linking**.

Purpose:

To create new materials, test their properties, and compare them to silly putty.



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Initial Observations:

Write down at least two initial observations that you recognize about for each material that you have been given.

Data Table 1: Substances

Elmer's Glue (Polyvinyl Acetate)	Borax	Cornstarch	Salt

Creating Material 1: Silly Putty

Materials:

Cup	Elmer's Glue	Eyedropper	Popsicle Stick
Eyedropper	Borax Solution		

Method:

- ___ 1) Fill the cup 1/3 full of glue
- ___ 2) Add one full eyedropper of borax solution to the cup. Stir the glue and notice what happens to it.
- ___ 3) Repeat step 3 until the glue can be lifted out of the cup with the stick.
- ___ 4) Remove glue and place in hands. Roll in hands until glue is no longer sticky. Add borax solution to hands if glue is sticky.
- ___ 5) Place silly putty off to the side. This is material 1.



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Creating and Testing Materials 2 and 3:

Materials:

Elmer's Glue Borax Powder or Solution Cornstarch Salt
 Ruler Scale

Aim:

Choose what new materials you will make to compare to silly putty. Write an aim for your test

(eg: To find out how adding x will affect the properties of the polymer)

Method:

Write up a method for how to create the other two materials. You can change the amounts of substances or the type of substances.

How will you test the materials. Plan out how you will collect your data and what you results table will look like.

Data Table - Properties of the Materials

Material:	Test 1 w/unit	Test 2 w/unit	Test 3 w/unit	Other Characteristics
Silly Putty				
Material 2				
Material 3				

Show your plan to the teacher for approval



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Running the Experiment

Follow your method to create your materials and test their properties.

Make notes to your method if you make changes or need to clarify anything.

Record your results in your table

Conclusion:

Write a conclusion in your based on the following questions. (Include additional information that you believe is helpful to know for this lab)

What is your answer for the aim in this lab.

Explain whether or not your hypothesis was correct and why?

What characteristics of each substance did you observe?

What were things that were done to substances to give them different characteristics?

Summarize your results. Explain any error that may have occurred in the lab. If there is something that you would do differently in the future explain what.

