Name:_____Date:_____

The Chemistry of Clothes

Biopolymers, Inc.

Student Worksheet, Part 2

Materials you will need:

- Your cooled biopolymer prototypes from Part 1
- Poster board
- Markers

Introduction: Plastic is durable and long-lasting, making it useful for packaging things like food, but not so good for the environment. Plastic in landfills can take hundreds of years to degrade, and plastic debris in the ocean is a threat to marine life. Traditional plastic is made from petroleum, but there is a movement now to make plastics from more renewable—and in some cases biodegradable—organic sources, like vegetable fats. These '**bioplastics**,' or **biopolymers**, can come in various forms with various physical properties. Knowing what kind of biopolymer would work best for a particular use is a creative design challenge!

Design Challenge: *You have just started your own biopolymer company. The purpose of your company is to design and engineer plastic-like materials that are more environmentally-friendly than traditional petroleum-based plastics. In order to do this, you will need to test out different recipes for* ***biopolymers*** *to learn how combining different ingredients in varying proportions changes the physical properties of the biopolymers. In Part 2 of this Design Challenge, you will apply what you learn from this materials testing stage to designing your products.*

Procedure

- Read over the various physical properties listed in your data table. Decide how you will test these different properties of your biopolymers. For example, to test 'stretchiness,' you can slowly pull the biopolymer in opposite directions and record how much it stretches until it breaks.
- Make and record observations about the physical properties of your biopolymer prototypes in your data table and add them to the class data sheet.
- Ask your teacher to assign you a plastic product, or choose your own. In your notebook, make a list of what physical properties this product needs to have to work or be useful.
- Use your data table and the class data sheet to decide which biopolymer recipe is ideal for your product.
- Create a poster advertising your new biopolymer product to share with your classmates. What is it made of? What makes it better than the traditional plastic product? What are some of its advantages and disadvantages? How is it more environmentally-friendly than traditional plastic?

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Biopolymers, Inc. Data Table, Part 2

Biopolymer recipe	Property: Hardness	Property: Stretchiness	Property: Strength	Property: Heat resistance	Property: _____