

# The Chemistry of Clothes



## Biopolymers, Inc.

### Teacher's Guide

#### Part 2 (60 minutes)

**Prep:** For Part 2, you will need one set of Student Worksheets per group, one piece of poster board per group, and markers.

#### Procedure

1. **Warm-up:** In their notebooks, have students spend about 5 minutes writing their thoughts on the following prompt: *Why do you think we might want to replace traditional plastics with biopolymer plastics? What are the advantages and disadvantages of each?*

2. Remind students of their **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.*

3. Assign each group a different type of plastic product (or let them choose their own): plastic utensils, plastic cling wrap, plastic water bottles, shower curtain liners, plastic bags, etc. (try to choose a variety of soft/hard/elastic plastic products). Hand out the **Student Worksheet for Part 2** and go through the instructions and procedure. In Part 2, students will be writing down observations of the physical properties of the biopolymers they made in Part 1, then using this information to decide which recipe would best suit the product they have been assigned.

**Teacher Tip:** *Create a class Google Sheet that students can enter their observations into so that everyone has access to all of the data.*

4. Give each group a piece of poster board and some markers. Students will be creating an advertisement for their company's product on the poster board and sharing their ads with their classmates through presentations or a gallery walk.

5. **Wrap-Up:** Have a class discussion about the process the students went through over the past two days:

- *How did changing the recipes for the biopolymers change their physical properties? Be specific. What do you think is going on at the molecular level when you are mixing together the ingredients and heating them up?*
- *When companies are creating new products, they often first create a 'prototype,' or test model, and then iterate on the prototype. To iterate means to make changes to the initial test model based on what worked and what didn't. Why do you think this iteration step is important in designing things?*
- *How are traditional plastics and biopolymer plastics different? What advantages do biopolymer plastics have over traditional plastics? What are their disadvantages?*
- *What are the strengths of your final design? What are the weaknesses? What would you want to change to improve on your design?*

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