Name: _____ Date: _____ Class: _____

Designing Polymers to Clean Water Worksheet

Before Building your Design

Directions: Answer the following questions below.

1. What is a foulant?

2. Why is it important to prevent foulants from the surface of water filtration membranes? (Identify the Problem)

3. Draw your design in the box below. Label the hydrophilic polymers, the **water filtration membrane,** the **foulants** and the **water.** (Brainstorming and Planning)

4. Predict how your design will work to block foulants from the surface of the water filtration membrane.

Building your Design

You will share your design with the rest of your teammates, and you will choose the best (or a combination of the best parts) of design to build.

5. How well did your design work? What might you need to improve? (Testing)

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6. What are some potential limitations of the model in comparison to real life? (Reevaluate the design)

Extension Questions:

7. What is the % efficiency water flow of your design? Calculate by using the following equation:

$$\%\ Efficency\ of\ water\ flow = \frac{\#\ water\ molecules\ pass\ through\ to\ membrane\ surface}{\#\ of\ total\ water\ molecules}\ \text{X}\ 100$$

Our **water flow efficiency %** is _____ %.

8. What is the **% foulant blockage** of your design? Calculate by using the following equation:

$$\%\ Foulant\ Blockage = \frac{Total\ \#\ foulant\ particles - \#foulants\ that\ pass\ to\ membrane\ surface}{\#\ of\ total\ foulant\ particles}\ \text{X}\ 100$$

Our **foulant blockage %** is _____ %.

9. Based on your calculations and test results, draw a new and improved design in the box below. Label the **hydrophilic polymers,** the **water filtration membrane,** the **foulants,** and the **water.**