**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)

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:

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

 Our **water flow efficiency %** is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ %.

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

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

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.**