Name: _____ **Date:** _____ **Class:** _____

Designing Polymers to Clean Water Worksheet Answer Key

Before Building your Design

Directions: Answer the following questions below.

1. What is a foulant?

An unwanted particle of any size that can cake or clog things (such as water filter membranes) and that can impair their function.

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

Because it can clog or stop the water filtration membrane from functioning properly, which means the filter would not be able to properly remove the undesired particles from the water. When people drink the different pollutants in the water because the filter is not working, they could get sick.

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

Answers may vary.

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

Answers may vary.

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? Answers may vary.

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

Answers may vary.

Extension Questions: (Answers may vary.)

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 _____ %.

Sample:

$$\%\ Efficency\ of\ water\ flow = \frac{5\ water\ molecules}{20\ water\ molecules}\ \text{X}\ 100 = 25\%$$

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 _____ %.

Sample:

$$\%\ Foulant\ Blockage = \frac{(10\ foulant\ particles - 3\ passed\ through\ foulants)}{10\ foulant\ particles}\ \text{X}\ 100 = 70\%$$

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.**

Answers may vary.