Designing Polymers to Clean Water

A Riddle:
What Am I?

I can be sparkling but I'm not a star
I can run but I don't have any legs
I can fall but I don't get hurt
I'm found in a bath but I'm not a rubber duck
I can help you clean but I'm not soap

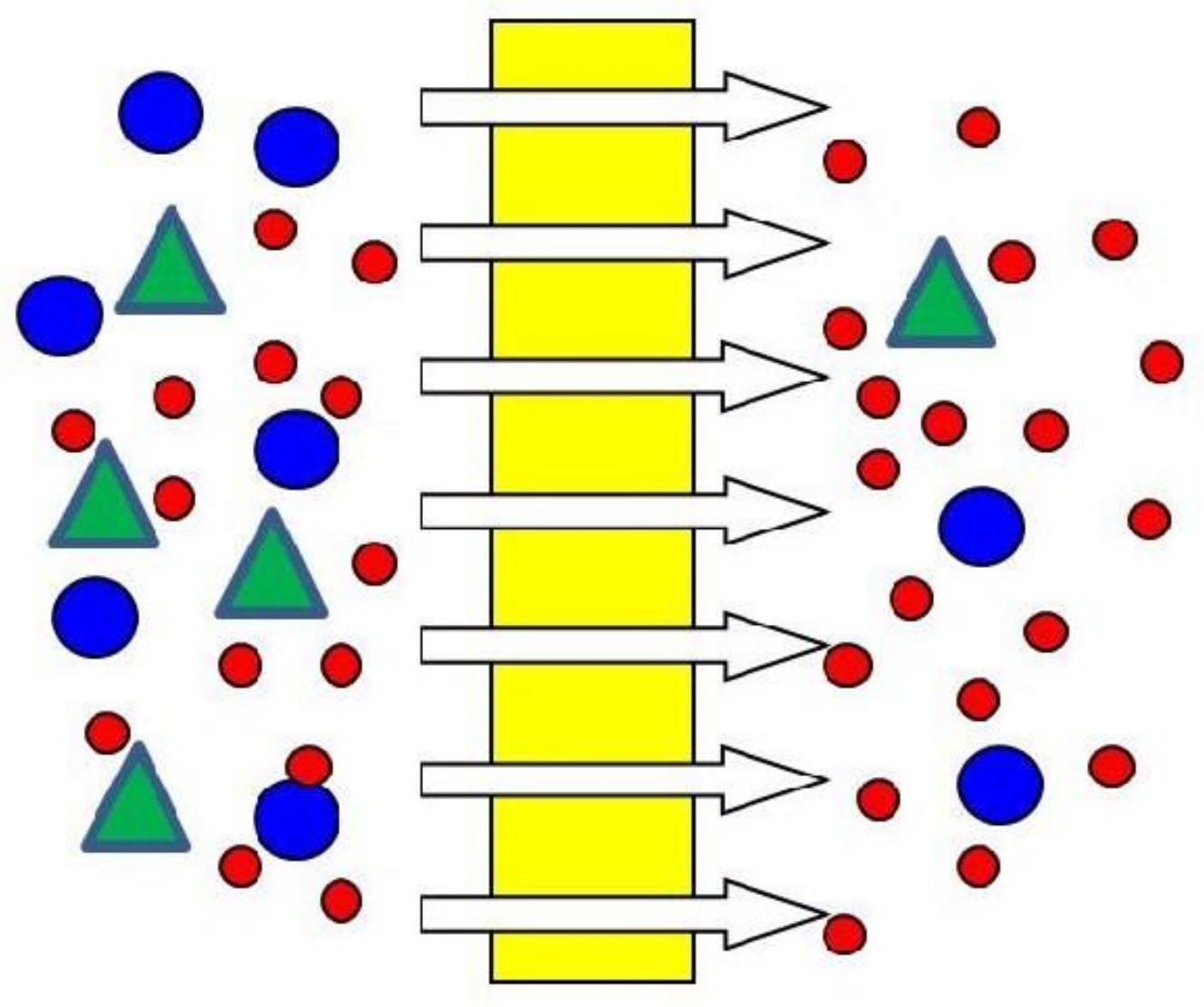
Clean Water

Water needs to be clean in order to be safe to drink.

Water Filters

Water filters are one method used for purification of water.

What do you notice about the water filtration membrane?



Fouling

Water filter membranes (separators) can get dirty or clogged over time with unwanted particles (or foulants).

Hydrophilic Polymers

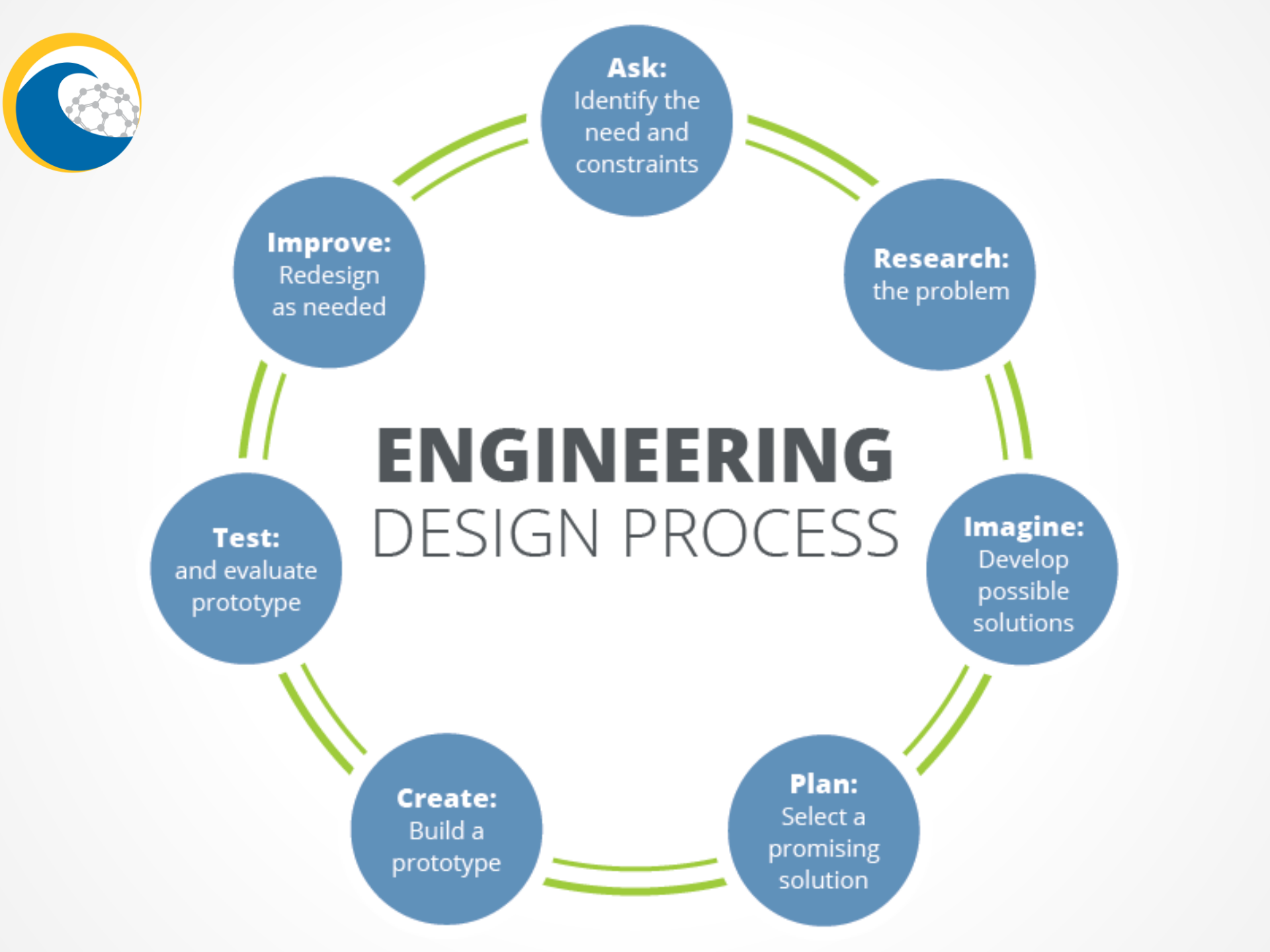
Researchers are using hydrophilic (“water-loving”) chemical chains (polymers) as a potential antifouling coatings for water filtration membranes. Hydrophilic polymers resist foulants.

Your Challenge

Today, you are the engineer who will use the engineering design process to…

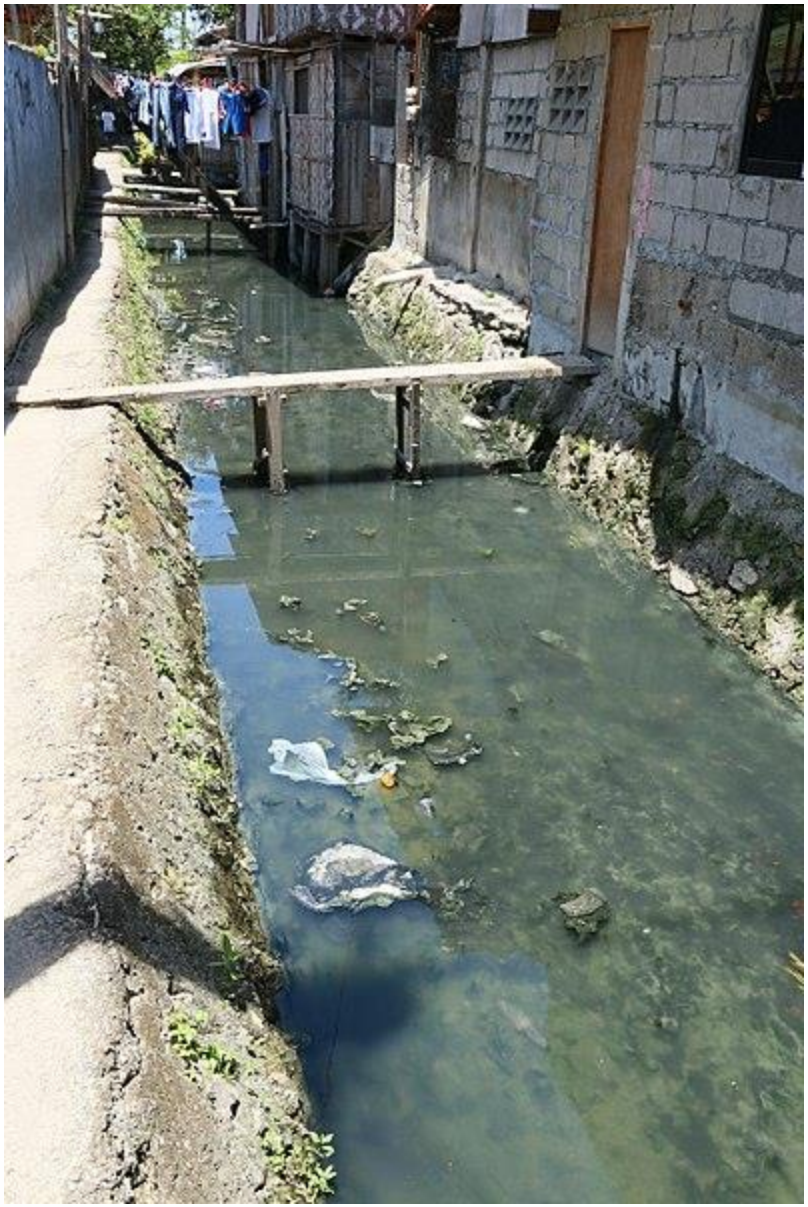
Design a model of adding an **antifouling** coating to a water filtration membrane using the materials at your table.

- Your coating should allow the water to interact the membrane, but keep the foulants away from the membrane.


ENGINEERING
DESIGN PROCESS
Ask: Identify the need and constraints
Research: the problem
Imagine: Develop possible solutions
Plan: Select a promising solution
Create: Build a prototype
Test: and evaluate prototype
Improve: Redesign as needed

Resources

- http://riddles-for-kids.org/water-riddles/
- File:Brita water filter in use.JPG. (2012, June 16). *Wikimedia Commons, the free media repository*. Retrieved 00:53, April 9, 2018 from https://commons.wikimedia.org/w/index.php?title=File:Brita_water_filter_in_use.JPG&oldid=72762277.
- File:Circle-question-blue.svg. (2017, December 8). *Wikimedia Commons, the free media repository*. Retrieved 01:05, April 9, 2018 from https://commons.wikimedia.org/w/index.php?title=File:Circle-question-blue.svg&oldid=271013147.
- File:1972 Clean Water Act (15197722145).jpg. (2016, October 20). *Wikimedia Commons, the free media repository*. Retrieved 01:17, April 9, 2018 from https://commons.wikimedia.org/w/index.php?title=File:1972_Clean_Water_Act_(15197722145).jpg&oldid=210279564.
- https://commons.wikimedia.org/wiki/File:Dead-end.svg




New Filter
Old Filters