

Semipermeable Membranes Worksheet

Define the Problem

You are part of an engineering team for a biomedical engineering company that is challenged to create the most innovative prototype to demonstrate the concept of permeability. You may use any of the materials provided at the front table. You will compete against other companies (student teams) to create the best prototype. The winning prototype will be shared at a national medical conference and developed as a marketable product with the potential for a good future income for you—its engineering inventors.

Constraints

Use **only three** of the materials listed below. Materials are available on a “first come, first served” basis.

sugar cubes	newspaper	copy paper	magazine paper
cardboard	paper plates	paper towels	fabric

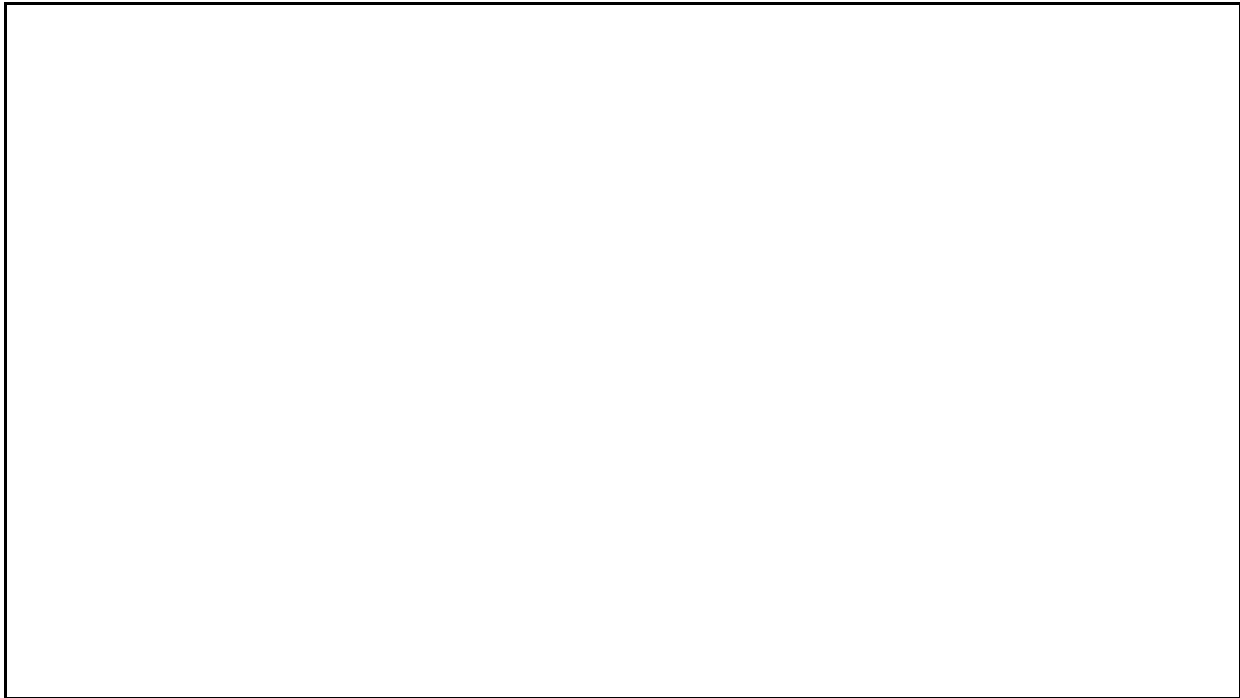
Research Notes, Ideas, Questions...

Describe “semipermeable” below. Use words and/or a diagram.

Name: _____ Date: _____ Class: _____

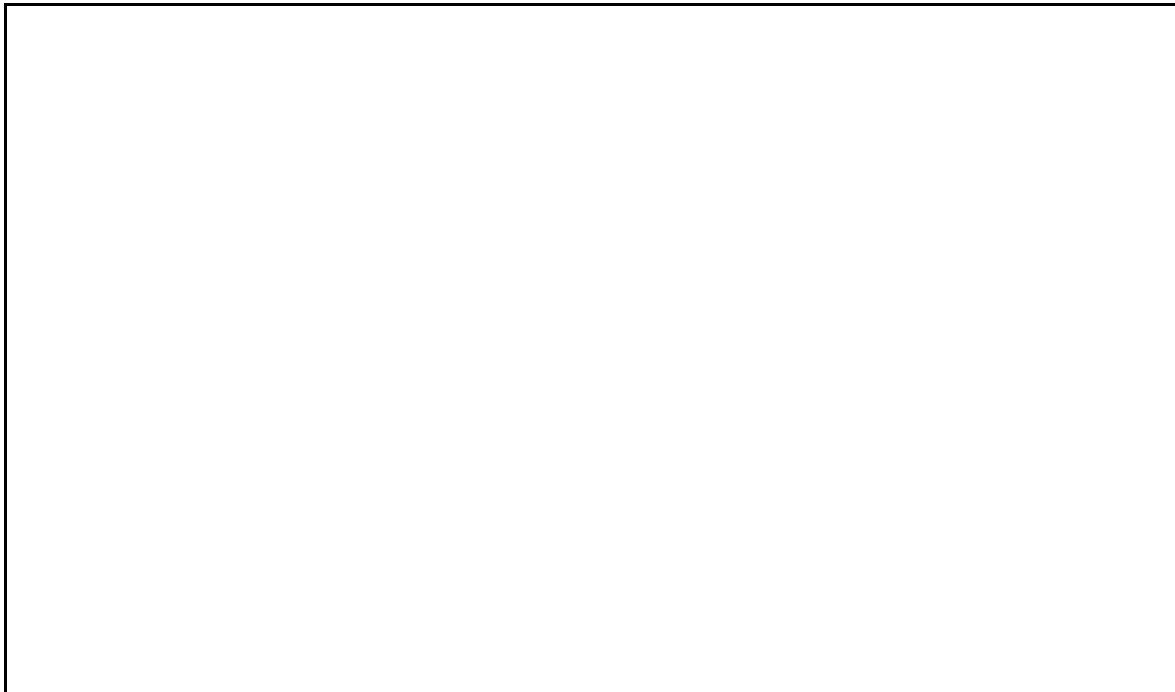
Brainstorm

Below, draw your group's idea of what you can make for a semipermeable membrane prototype. In your drawing, indicate what materials you are using.



Build

Construct your prototype and make a drawing of your final prototype below.



Name: _____ Date: _____ Class: _____

Test

Record your findings in the table below. Feel free to insert photos/drawings of your progress.

Test Criteria	Trial 1	Trial 2	Trial 3	Trial 4
Drops of water to get through the membrane				
Seconds it takes to move through the membrane				

Redesign

How will you redesign your prototype? Answer the questions below.

<i>What will you keep?</i>	<i>What will you change?</i>
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Make a drawing of your redesigned prototype.



Name: _____ Date: _____ Class: _____

Retest Revised Design

Record your findings in the table below. Feel free to insert photos/drawings of your progress.

Test Criteria	Trial 1	Trial 2	Trial 3	Trial 4
Drops of water to get through the membrane				
Seconds it takes to move through the membrane				

Final Presentation

Make a drawing of your final prototype design. Explain the elements of your prototype.



Analysis

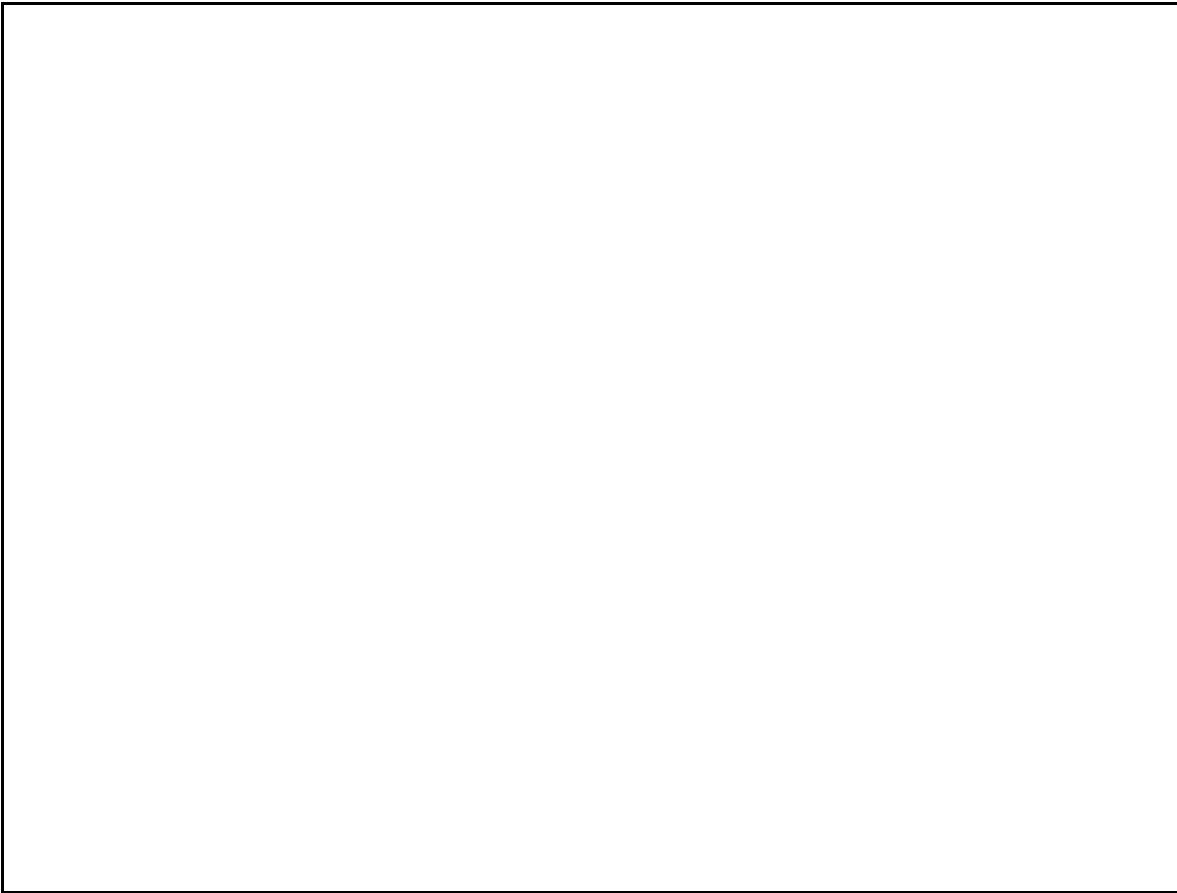
Answer the questions below.

1. Compare your design to the designs of other groups. *How are they similar? How are they different?*

2. Which materials worked the best? Consider all designs.

Name: _____ Date: _____ Class: _____

3. As a class, work together to design the best prototype with each group contributing ideas and elements to the new prototype. Make a drawing that includes an explanation of the elements.



4. Test the new class prototype design and record your findings below.

Test Criteria	Trial 1	Trial 2	Trial 3	Trial 4
Drops of water to get through the membrane				
Seconds it takes to move through the membrane				

5. Conclusions: