

Student Worksheet or Guide

Modeling Self-Assembly, Part II: *The Water Maze*

Lab-on-a Chip, Inc. may hire your team to design a device that will allow people in remote areas to do medical blood tests. Blood is mostly made of water, and our company has had difficulty in controlling how the blood moves through the chip.

Your task is to design a maze that allows water molecules to move from one end of a maze to the other end, down a desired path using some of the tools provided and using self assembly. Use only the tools that you need. Please remember that, when working with things this small, gravity has no effect.

Finally, you will present your plan to the CEO of the company, who will hire the team with the best plan and presentation. Our company is looking for scientific accuracy, and creativity in the design.

Problem: How can our group create a water maze using only self assembly?

Procedure: Review the cards of the tools and molecules at your disposal. Answer the questions below:

1. What does each end of water attract to? _____

2. How will you move the water molecules? _____

3. How will you keep the water molecules going down one path? _____

4. How are you going to manipulate the self assembly of this design that will put all the molecules in the places that you want them? _____

5. What mask(s) will you use? You can design a mask and make as many masks as necessary to complete the challenge. _____

6. What order will you apply the molecules to the wafer? _____

7. Write the steps for your procedure. For each step, explain why you are taking this action.
If you have more steps, write them on the back of the page.

| Procedure | Why you are taking this step? |
|-----------|-------------------------------|
| 1. | |
| 2. | |
| 3. | |

8. Draw your design on the butcher paper. Label your design. Color each part so that each component is easy to see.

9. Use the back of this page to explain why the water molecules will follow the path.

10. What parts of your plan are you uncertain whether it will work? _____

Presentation Rules:

1. Everyone must have a speaking part.
2. Each presentation must explain:
 - The steps of assembly
 - The reasons for the steps
 - The final maze design
 - How the maze moves the water molecules
 - Some concerns as to how well this will work
3. Have the butcher paper with the design clearly drawn and labeled. Make your words and drawings big, colorful, and easy to read from the back of the room.