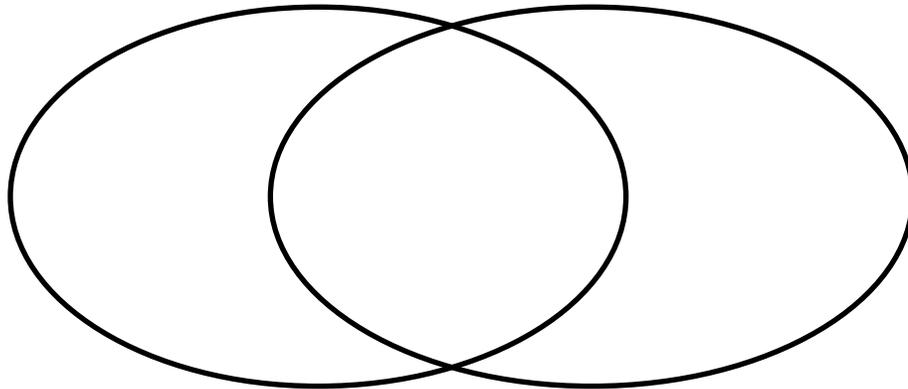




***To See or Not to See? Demonstration Activity***

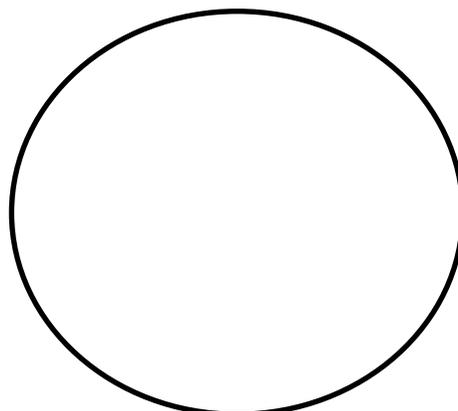
Name: \_\_\_\_\_ Date: \_\_\_\_\_ Class: \_\_\_\_\_

**Think/Pair/Share:** 1. Without touching the inside of the petri dish, carefully observe them. How are they the same? How are they different? Show your answers below:



2. The teacher will now ask you to do something. What changed?

3. Draw what you see: with the colored pencil, **shade in** the areas where the water goes (sticks).



4. Prefix for water= \_\_\_\_\_ Suffix for “fearing” = \_\_\_\_\_ Suffix for “liking” = \_\_\_\_\_  
water “fearing”= \_\_\_\_\_ water “loving”= \_\_\_\_\_

5. What do you think caused the change in the petri dish? Why?

6. Can you think of some products that use this technology (hydrophobic)?

7. How is the corona treatment related to nanotechnology?



Name: \_\_\_\_\_ Date: \_\_\_\_\_ Class: \_\_\_\_\_

## Student Worksheet

### *To See or Not to See? Lab Activity*

#### Safety

Be careful when around the Tesla coil. Do not touch the coil or any part of the base while it is on.

**Introduction:** Yesterday you saw how we could chemically change the surface of a plastic dish to make it both hydrophobic and hydrophilic. Today you will get a chance to repeat that by creating your own “hidden message!”

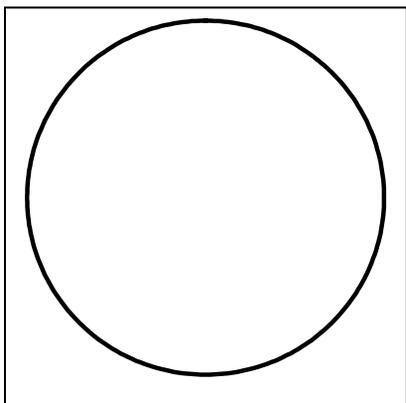
#### Materials:

Petri dish  
Stickers/sticker sheet  
Stopwatch or timer  
Water bottle  
Tweezers

#### Procedure I:

1. Decide what shape/design you want for your mask using the materials provided.
2. On the bottom of the dish place the sticker down. Press it down gently, you don't want any air bubbles between the sticker and the dish. Turn the dish over to make sure there are no air bubbles.
3. Wait until the teacher calls you up to treat your dish.

**While waiting answer the questions.**



#### Procedure II: After your dish is treated.

1. When your dish is treated, slowly peel the sticker off with a tweezers. **DO NOT TOUCH** the inside of the dish, or you will ruin it with the oils from your fingers.
2. Breathe on the dish to see your image. Then you may add a **little** water to the dish. If you add too much you will not see the image.
3. Draw your image in the circle to the left.
4. Cover your dish with the lid to take it with you.



### Review Question:

1. What is the difference between hydrophobic and hydrophilic?

### Research questions:

**In this lab, we took inspiration from nature and reproduced it in the lab chemically! Scientists do this all the time. We call this Biomimetics or Biomimicry.**

### Read and answer the following questions:

Commercial products have frequently taken their inspiration from nature. Scientists often look at nature to get ideas and designs for products that can help us. We call this study of nature **biomimetics**. Almost all living organisms are uniquely adapted to the environment in which they live, some so well that scientists study them in hopes of replicating their natural designs in products and technologies for humans. For example, when humans were trying to decide how to fly, they examined the flying organisms, birds and insects, and realized that wings were a fundamental idea. Burrs on a dog's coat led to the invention of Velcro. After looking at the burr closely, engineer George de Mestral noticed there were special hooks and loops that gave the burr its "stickiness." That's an example of biomimetics—the science of adapting designs from nature to solve modern problems. Hydrophobic and hydrophilic properties were also first noticed in nature. Learn more about what scientists call the Lotus effect.

Go to [http://nisenet.org/catalog/media/zoom\\_lotus\\_leaf\\_video](http://nisenet.org/catalog/media/zoom_lotus_leaf_video) Watch the video, and answer the following questions:

1. What is unusual about the Lotus leaf and where it lives?
2. As you zoom in, what is the surface of the leaf actually like?
3. The superhydrophobicity happens because of ?
4. As you zoom in what is the texture of the leaf actually like?
5. What is on the bumps-what makes the Lotus leaf so effective at repelling water?



6. Research and briefly explain about another organism in nature that scientists are trying to mimic. To start, go to: How Biomimicry is Inspiring Human Innovation; Smithsonian Magazine: <https://www.smithsonianmag.com/science-nature/how-biomimicry-is-inspiring-human-innovation-17924040/> or Biomimicry: 9 Ways Engineers Have Been 'Inspired' by Nature accessed at: <https://interestingengineering.com/biomimicry-9-ways-engineers-have-been-inspired-by-nature>

