

Investigating Hydrophobicity Lab Protocol

You will test different biological and non-biological objects to investigate whether their surface is hydrophobic, hydrophilic, or in between. Before starting, you will take a few minutes to practice describing different textures and making identically sized water drops.

Texture Sort Pre-Lab

Sort and describe the material samples to establish a common language for discussing and comparing textures.

Materials

- 5 paper lunch bags, each containing a material sample.
- 5 index cards
- 5 paper clips for attaching card to bags

Procedure

1. Feel five different mystery material samples, one at a time, each hidden in a paper lunch bag.
2. Think of words that describe the texture of the material in the bag, and write them on the index card clipped to the bag. Try to use additional words beyond “smooth” and “rough” to describe texture.
3. Take the materials out of the bags and arrange them in order from smoothest to roughest. Number the cards from 1 to 5, with 1 being the smoothest. **Save this texture scale as a reference for your hydrophobicity investigation.**

Water Drop Standardization Pre-Lab

An important part of an experiment like this is making sure that the same procedure is carried out on all materials being tested. One factor you can control in your hydrophobicity investigation is the size of your water drops. *Why is it important in this experiment to make sure all the water drops are similar?* This activity will help you become skilled at creating identically sized water drops.

Materials

- Laminated index card with reinforcement circles
- Pipette or eyedropper
- Water

Procedure

1. Using a pipette or eyedropper, place two drops of water in the center of each circle to create evenly sized large water drops.

Investigating Hydrophobicity

There are a couple of tests we can conduct to gauge the hydrophobicity of a material. By looking at the shape of the water drop profile (side view) and conducting a tilt test, we can get an idea of how much water is absorbed or repelled.

Materials

- 4-5 test materials (flat things work best)
- Clipboard
- Protractor
- Scissors
- Masking tape and/or duct tape
- Small container of water
- Eyedropper or pipette
- Paper towels
- Hand lens (magnifying glass)
- Observation datasheet

Procedure

Sketch Water Drop Profile

1. Select a material to test.
2. Place two drops of water on the surface to make one large drop.
3. Look at the large drop from the side, and sketch the drop's profile view on your Observation Datasheet.

Do a Tilt Test

4. Tape the bottom edge of the clipboard to the tabletop.
5. Clip your material onto the clipboard. *Note: Remember to fasten your material as flat as possible on the clipboard, trying not to touch its surface, because oil from your fingers can affect hydrophobicity.*
6. Place two drops of water on the material to make one large drop of the size you created in the Water Drop Standardization activity.
7. **Person 1:** Hold the protractor centered at the bottom corner of the clipboard and view it at eye level.
Person 2: Slowly raise the clipboard.
Person 3: On your Observation Datasheet, record the angle when the water drop begins to slide. If the water drop does not slide, check the box indicating that the drop was absorbed.

Check Texture

8. After you have finished conducting your tilt test, feel the surface of your object and rate it based on the scale you created during the Texture Sort activity.

Hydrophobicity Scale

9. Attach your material to the datasheet. Post your datasheets on the board or a wall, in order of lowest tilt angles to highest tilt angles.
10. Repeat steps 1-10 until all materials have been tested and all datasheets have been posted.