**Fabric Testing Lab Handout**

**Strength and Stretch**

*Hypothesis* (rank from weakest to strongest):

Fabric 1:

Fabric 2:

Fabric 3:

Fabric 4:

*Directions*

1. Measure the unstretched length (the longer dimension) of a piece of fabric
2. Cut a small hole 2cm from the edge of the fabric
3. Loop the force gauge hook through this hole
4. Let one person hold the force gauge and the other hold the fabric end
5. Use the force gauge to pull on the fabric. Apply a force of 20N to put tension on the fabric and make sure to keep it parallel to the floor for 10 seconds
6. Measure the final length of the fabric while applying the consistent force.
7. Enter your data below and calculate the final column.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
|  | Original Length | Final Length | Force | Force / (Final Length - Original Length) |
| Fabric 1 |  |  |  |  |
| Fabric 2 |  |  |  |  |
| Fabric 3 |  |  |  |  |
| Fabric 4 |  |  |  |  |

**Wind resistance**

*Hypothesis* (rank from most to least wind resistance):

Fabric 1:

Fabric 2:

Fabric 3:

Fabric 4:

*Directions*

1. Put the fabric against your mouth using two hands
2. Blow as hard as you can on the fabric
3. If there is significant resistance, then that fabric is more wind resistant, if there is no resistance, then there is little wind resistance

|  |  |
| --- | --- |
|  | Observations about resistance |
| Fabric 1 |  |
| Fabric 2 |  |
| Fabric 3 |  |
| Fabric 4 |  |

**Hydrophobicity**

*Hypothesis* (rank from least to most hydrophobic):

Fabric 1:

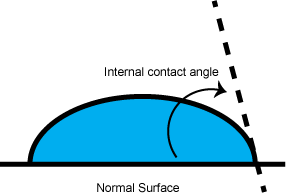
Fabric 2:

Fabric 3:

Fabric 4:

*Directions*

1. Take a piece of fabric and lay it on the edge of the table
2. Place a drop of water in the center of the fabric
3. Wait a few seconds before using your camera to take a picture of the water droplet from the side point of view. We want a level picture of the droplet. An example is displayed below.



1. Use a protractor on the picture that you took to find the internal contact angle (look above for example).

|  |  |  |
| --- | --- | --- |
|  | Contact angle of droplet | Other observations |
| Fabric 1 |  |  |
| Fabric 2 |  |  |
| Fabric 3 |  |  |
| Fabric 4 |  |  |

**Water absorption**

*Hypothesis* (rank from least to most absorptive):

Fabric 1:

Fabric 2:

Fabric 3:

Fabric 4:

*Directions*

1. Use a scale to mass a piece of fabric
2. Submerge the fabric into water for 1 minute, make sure all of the fabric sample is fully in the water
3. Remove the fabric from water and allow excess water to drip out, do not squeeze water out of the fabric sample
4. Remass the wet fabric once the dripping has reasonably stopped
5. Subtract the dry mass from the final mass to quantify the amount of water retained by sample fabric

|  |  |  |  |
| --- | --- | --- | --- |
|  | Mass before water (g) | Mass after water (g) | Difference in mass (g) |
| Fabric 1 |  |  |  |
| Fabric 2 |  |  |  |
| Fabric 3 |  |  |  |
| Fabric 4 |  |  |  |

**Discussion questions**:

Do you have any guesses as to what polymers were used for certain fabrics?

How do you think certain fabrication or processing methods lend to specific properties you have tested in these fabrics?

Did you have assumptions about how different fabrics would perform? Did these hypotheses end up being true?

What properties of these fabrics were you able to explore through these experiments?

Were the experiments able to provide you more information than just looking at or touching the materials?

What are some of the pros and cons of each fabric in terms of its properties, but also from an economic and sustainability viewpoint?