**Wicking Materials Investigation Procedure**

Since the engineering problem requires that the students design a system using a wicking system, the students will need to investigate the effectiveness of different types of materials in absorbing water as well as the speed with which they absorb water. A materials engineer is a person who studies and develops materials that have specific properties to solve a problem.

*Investigation Question:* Which material (cotton, cotton/polyester blend, wool, felt, etc.) absorbs water the fastest and absorbs the most water?

Materials needed:

* 1 metric scale
* 4 cups for weighing materials
* Scissors
* 4 strips of white materials cut 3 cm x 15 cm (i.e., cotton, cotton/polyester blend, wool, felt).
* 1 large clear container that can hold 800 ml of water (**or** 4 small clear plastic cups that can hold 100 ml of water each)
* Red food coloring
* 1 centimeter ruler
* Masking tape

Students will:

* Cut different types of material into 3 cm x 15 cm strips—Be careful to point scissors away from self and others.
* Place each of the material strips into a separate cup and weigh each using a metric scale.
* Record the weights on the data sheet.
* Fill 1 large container with 800 ml of water and 5 drops of red food coloring (**or** 4 small clear plastic cups with 100 ml of water and 1 drop of red food coloring each).
* Tape each strip on the ruler--equidistant along the ruler so that each is able to hang down.
* Label each strip on the masking tape with the name of the material.
* If you are using 4 plastic containers, line them up next to each other in a row.
* Hold the ruler with the 4 strips hanging down above the one large plastic (or 4 plastic cups) so that each strip touches the top of the water in the respective containers.
* Watch and identify which strip absorbs the water to the top of the strip first, second, third, and fourth and record on the data sheet.
* Remove each strip and place each in a separate cup to weigh again.
* Record the weights on the data sheet.
* Subtract dry weight from wet weight to obtain the amount of water absorbed by each strip.

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| **Recording Sheet: Data from Testing Different Wicking Materials** | | | | |
| **Type of material strips tested**  **(each strip is 3 cm x 15 cm)** | **Weight of dry strip in a cup** | **Weight of wet strip in a cup** | **Amount of water absorbed by the strip** | **Ranking of speed of absorption**  **1 (fastest) to**  **4 (slowest)** |
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In teams, students will discuss the data and generate an explanation about which type of material may work best for a wicking system and explain their reasons for this choice.

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| **Conclusion Drawn from Wicking Investigations—Provide Evidence and Reasoning** |
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