



Every Bit a Wet Mitt


Oooh! That's Cold! Have students use old mittens and gloves to do an experiment about the insulating and water resistant properties of different materials.


THE following activity challenges students to evaluate experimental design. A collaborative and fun approach makes for engaging science. The themes of this experiment relate to adaptations of marine mammals, survival needs, renewable and non-renewable resources, technology and extreme environments.


MATERIALS


-  Worksheets


-  Plastic Bags

-  Buckets/sink filled with cold water and ice cubes

-  Timers, watches or clocks

-  Old mittens/gloves of every material

-  Sponges/cloths for cleanup

-  Plastic sheets to protect the workstations

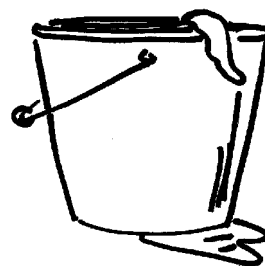
Steps

- 1)** Ask students to bring old mittens and gloves from home. The experiment will work better with a diversity of materials, synthetic, wool, rubber, fur, leather, cloth etc.
- 2)** Fill buckets or a sink with cold water from the tap, add ice cubes.
- 3)** Create 4-5 stations around the class with the buckets full of ice water and a collection of mittens and gloves for testing. Four should be placed at each station. Place plastic sheets under the workstations to protect them from water damage.

During your class have your students divide into 4-5 groups. Each student should have a chance to test at least two different mittens *or* two different gloves. **(1)** To test, students must put one hand in a mitten/glove. **(2)** A plastic bag should be placed over each hand and then the students put both of their hands into the water, taking care not to let any water into the bags. **(3)** One member of the group can time the students for a period of 10 seconds. **(4)** Students may record their qualitative observations on the worksheet provided. **(5)** Students repeat the test without the plastic bags. **(6)** Repeat the whole experiment (steps 1-5) for each student using a second mitten or glove.

Compile the class results. **Discuss** the experiment with your class using the attached guide.

EVERY BIT A WET MITT WORKSHEET



Write down the results of your experiment in the space provided.

Name:	Date:
Group Name:	

Write the description of the mitt or glove material below	Insulation (Dry)	Insulation (Wet)	Water Repellency
<i>Mitt / Glove Description:</i>	<input type="checkbox"/> Warm <input type="checkbox"/> Lukewarm <input type="checkbox"/> Cool <input type="checkbox"/> Cold	<input type="checkbox"/> Warm <input type="checkbox"/> Lukewarm <input type="checkbox"/> Cool <input type="checkbox"/> Cold	<input type="checkbox"/> Dry <input type="checkbox"/> Damp <input type="checkbox"/> Wet <input type="checkbox"/> Soggy
<i>Mitt / Glove Description:</i>	<input type="checkbox"/> Warm <input type="checkbox"/> Lukewarm <input type="checkbox"/> Cool <input type="checkbox"/> Cold	<input type="checkbox"/> Warm <input type="checkbox"/> Lukewarm <input type="checkbox"/> Cool <input type="checkbox"/> Cold	<input type="checkbox"/> Dry <input type="checkbox"/> Damp <input type="checkbox"/> Wet <input type="checkbox"/> Soggy

Record the results of your group's experiment below

Which material was the warmest when dry?

Which material was the warmest when wet?

Which material was the driest?

Every Bit a Wet Mitt:

Things to Talk About With Your Class

What makes materials warm?

Materials do not *make* things warm – they *insulate!* The reason mittens or gloves are warm is because they do a good job of trapping the heat your body creates. Some materials insulate better than others.

If your mitt gets wet it often gets cold. Why does this happen?

Mitts and gloves trap a layer of warm air around your body. When your mittens get wet, water allows heat to move away from your body – water is a good *conductor*.

Which materials insulate the best when dry? When wet?

Many materials insulate well when dry. Wool, fur, down, polypropylene are some of the best insulators when dry. Cotton and down insulate quite well when dry, but are very poor insulators when wet, wool and silk on the other hand can insulate very well wet and dry. Fur is a very good insulator when wet as long as there are some natural oils left in the pelt, if the fur is old, and/or has been stripped of natural oils it will insulate poorly. Fabrics like Nylon, acrylic, polyester and polypropylene insulate very well when wet because they absorb very little water. Generally, the less water a material absorbs when it is exposed to water, the better that material will be at keeping you warm in wet environments.

How do warm-blooded animals like whales, dolphins, seals and sea otters adapted to a cold-water marine environment?

Whales, dolphins and seals use thick blubber to insulate their bodies so they do not lose heat as quickly. Blubber is a very good insulator. Sea Otters have to eat a lot of food to stay warm. Sea Otters also use thick fur to trap warm air around their bodies; the oils from their skin keep the water away from their skin so their bodies stay warm. Birds and mammals will groom themselves to make sure their feathers and fur are covered with these natural oils.

Which of the materials that you tested are considered renewable? Which are considered non-renewable?

Wool, leather, fur, silk, cotton and rayon are renewable fibres and come from animals and plants and are considered renewable. Nylon, acrylic, polyester and polypropylene are made from products like coal, petroleum and natural gas and are considered non-renewable.

Imagine travelling to an extremely cold environment. What kinds of materials would you bring with you to keep warm?

To stay warm you need to pick a good insulator that keeps the water away from your skin. The material also has to *let some water out* because the sweat from your body will start to cool you down. Dress in layers so you can adjust to the right temperature, trap more air around your body and avoid sweat buildup inside your clothing.