

Warm Coats

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INTRODUCTION

Humans have used many different types of materials to protect themselves from the weather. Some materials are used to keep people warm while others are used in hot weather to protect them from the sun.

Early humans wore furs and hides for warmth. Later people used down and wool as well as cloth made from various types of plants. More recently scientists have developed *synthetic* materials that are widely used for clothing. Each material has qualities that make it suitable for a particular use. Some materials may be better for keeping warm. Some may be better for keeping cool. Some clothing is durable while some may not be able to put up with hard wear.

This activity will help you better understand which materials keep you warmer than others

TIME NEEDED

Preparation: 20 min.

Completion: 30 min.

WHAT YOU NEED

- leather glove (unlined or lined with silk, wool, or fur)
- *synthetic*-material glove
- wool glove
- cotton glove
- ice cubes
- thermometer
- plastic storage bag or plastic wrap
- stopwatch or watch with second hand

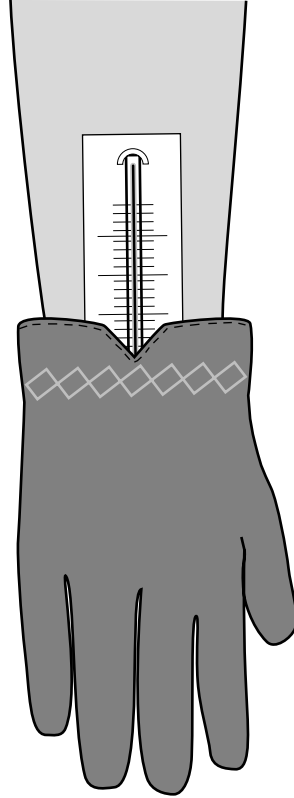


Safety Precautions

Please click on the checkmark to view the safety guidelines.

WHAT YOU DO

1. **Put** on leather glove and **slide** thermometer inside it.

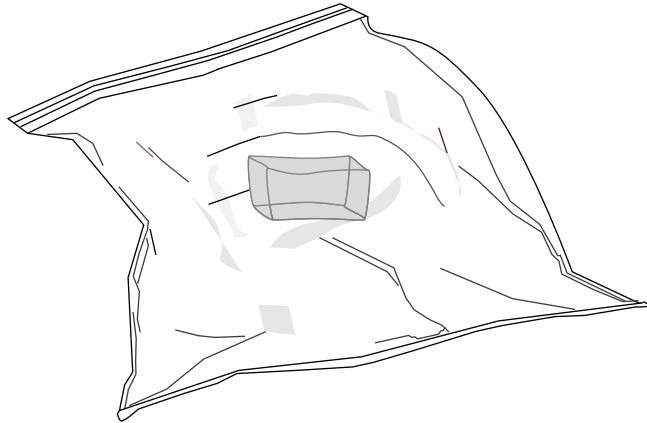


2. **Take out** thermometer after 1–2 minutes and **record** temperature on data table.

Data Table

GLOVE MATERIAL	TEMPERATURE Without Ice	TEMPERATURE With Ice
Leather		
Synthetic		
Wool		
Cotton		

3. **Place** ice cube in storage bag or plastic wrap.



4. **Hold** wrapped ice in gloved hand for 1–2 minutes.
5. **Slide** thermometer inside glove to measure temperature, then **record** it on data table.
6. **Repeat** procedure using synthetic, wool, and cotton gloves, allowing 2 minutes between changes of gloves for hand to return to normal temperature.
7. **Record** temperatures inside each glove without ice and with ice on data table.

OBSERVATIONS

1. How did temperatures using the different materials vary?
2. What materials do you wear when you want to keep warm?

OUR FINDINGS

Click on the above link to see what we found.

Follow-Up

Many people wear darker-colored clothing in winter because it can help to keep them warmer. Find out how. Tape a piece of white paper around a paper cup. Tape a piece of black paper around another cup just like the first one. Now fill the cups with water and let them sit in the sun for about 1/2 hour. Put a thermometer in each cup to test the water. Which is warmer? Why? Dark colors absorb the sun's light and heat faster.

Words To Know

durable — lasting, even with much use

synthetic — human-made, not found in nature

Our Findings

4. LIFE SCIENCE

4.8 WARM COATS

1. Your results depend on what kind of lining you had in the leather glove or if it was lined at all. But usually the materials wool or fur was warmest, followed by cotton and synthetic.
2. Everyone's answer will probably be different, but some possibilities are: a down jacket, cotton ,jeans, wool sweater, wool cap, woolen mittens or gloves, and fur-lined gloves.

SAFETY GUIDELINES

Special Safety Note To Experimenters

Some activities in this book have special safety rules to follow. The special rules are on the page with that activity. But even if every safety rule in the world is not listed with an experiment, you have to know how to be safe when doing science projects. So it's very important that you read, copy, and follow the Everyday Safety Rules that follow.

Sometimes science experiments can be dangerous. Things can spill, break, or even catch fire. You have to know what to do. . . fast. So be prepared. Read the directions for each experiment carefully, and follow any special safety rules listed with it, then be careful.

Always follow common-sense safety rules like NEVER RUN WITH SCISSORS IN YOUR HAND or BE CAREFUL WITH HOT THINGS! You already know a lot of common-sense safety rules ...so remember to follow them, and have fun!

Everyday Safety Rules

PREPARE

- Clear off your work space.
- Read all directions.
- Know what problems might happen, and be prepared.

PROTECT YOURSELF

- Follow directions step-by-step.
- Do just one experiment at a time.
- Locate exits, fire extinguisher, eye wash, and first-aid kit before you start. Ask an adult to show you how to use a fire extinguisher.
- Be sure there's fresh air in the room.
- Wear an apron and safety goggles.
- Don't wear contact lenses, have bare feet, or wear very loose clothing.
- Keep work space and floor clean.
- Clean up spills immediately,
- Don't drink or eat around the experiment work space.
- Don't eat or drink any stuff tested, unless a grown-up says it's OK.

USE EQUIPMENT CAREFULLY

- Don't set up equipment too near the edge of your work space.

- Be cautious when using pointed or sharp instruments, like scissors, screwdrivers, or knives.
- Unplug any electric device by pulling out the plug, not pulling on the cord.
- Use only low voltage batteries, like those used in flashlights or smaller.
- Be careful when using chairs or step-stools.

USING CHEMICALS

- Have an adult help you with all experiments requiring chemicals.
- Don't inhale or taste chemicals.
- Read all labels carefully.
- Label all chemicals.
- Wear goggles, apron, and gloves so chemicals don't touch your skin.
- Wash hands before and after using solutions.
- Wipe up spills thoroughly.

HEATING THINGS

- Wear goggles, apron, and gloves when boiling water.
- Use safety tongs and heat-resistant mitten or hot pads.
- Never leave heated things unattended.
- Turn off hot plates and oven burners when you're finished.
- Keep flammable things away from heat and flames.
- Have a fire extinguisher ready.

IN THE FIELD

- Never go on a field trip alone: follow the Buddy System.
- Tell a responsible grown-up where you're going.
- Know the area and be aware of dangers, like poisonous plants and deep water.
- Dress for the weather conditions.
- Bring along a first-aid kit.
- Don't drink water or eat plants in the wild, unless the grown-up you're with says it's OK.

FINISHING UP

- Clean up the equipment and your work space.
- Return chemicals to the proper containers.
- Don't throw stuff down the drain unless instructed to.
- Wash your hands.
- To protect the environment, get rid of chemicals according to local, state, and federal laws.