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Insulate Yourself—With Your Clothes!

Michigan State University

Cooperative Extension Service

Gail Skinner, Extension Clothing Specialist, University of Nebraska, Lincoln

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ENERGY FACTS

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Michigan State University

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Cut Heating Costs:

Insulate Yourself— With Your Clothes!¹



With energy costs continuing to skyrocket, we are all looking for ways to stay warm in our homes this winter and still save on fuel bills.

Of course, you know that clothing can make a difference. The more clothing we wear the warmer we'll be. But do you know how much? Clothing can make a greater impact on keeping you warm than you realize.

A man who puts on a jacket over his shirt and tie, for example, will be as comfortable at a temperature of 70°F (21.1°C) as he previously was at 74.5° (23.6°C). A woman who wears slacks instead of a skirt and puts a light, long-sleeved sweater over her blouse will feel as comfortable at 75° (23.8°C) as she previously did at 78° (25.5°C) — she'll be three degrees warmer.

According to the John B. Pierce Foundation of New Haven, Connecticut, and to figures provided by Dr. Ralph Goldman of the U.S. Army Ergonomics Laboratory, clothing changes can make significant differences in our comfort.

If a woman:	She can lower the thermostat setting:
Replaces a skirt with slacks	1.5°F
Replaces a sleeveless dress with a long-sleeved dress	.2°F
Replaces a dress made of an open weave with a tightly woven fabric	.5°F
Wears nylon stockings	.1°F
Wears a full slip	1.0°F
Replaces a half slip with a full slip	.6°F
Replaces a sandal-type shoe with a heavier shoe	.2°F
Pulls on a light, long-sleeved sweater	1.7°F
Pulls on a heavy, long-sleeved sweater	3.7°F

¹ This bulletin is adapted from an article of the same title, written by Gail Skinner, Extension Clothing Specialist, University of Nebraska, Lincoln. The article appeared in *Nebraska Farm, Ranch and Home Quarterly* (Vol. 23, No. 3, 1976, pp. 7-8), published by the Institute of Natural Resources, University of Nebraska, Lincoln.

He can lower

If a man:	the thermostat setting:
Replaces light pants with heavy pants6°F
Replaces a summer-weight jacket with a winter-weight jacket	2.5°F
Replaces a short-sleeved shirt with a long-sleeved shirt8°F
Puts on a winter-weight jacket	4.5°F
Puts on an undershirt (T shirt)5°F
Puts on a tie2°F
Replaces ankle-length socks with knee-length socks6°F
Puts on a light, long-sleeved sweater	2.0°F
Puts on a heavy, long-sleeved sweater	3.7°F

As the chart shows, the amount and type of clothing can have a significant effect on comfort and warmth. Other factors also contribute to the warmth of clothing.

Absorbency affects a garment's warmth. The more absorbent the garment, the more it will allow perspiration and body moisture to evaporate from your skin. This moisture evaporation is essential for keeping warm. The body normally produces as much as a pint and a half of perspiration a day; if this perspiration is not allowed to evaporate from the skin, it condenses on the clothing and releases heat into the air. This moisture then returns to the skin; as a result, heat is drawn out of the body to help evaporate the moisture all over again.

With an absorbent fabric, on the other hand, body moisture is allowed to pass through as vapor so the body stays warmer.

The fiber content of a garment will tell you about its absorbency. Natural fibers such as cotton and wool are the most absorbent.

HEAT GENERATED

A certain amount of perspiration is expelled by the body no matter what the level of activity. But as activity level rises, and the body generates more heat, the body also perspires more to rid itself of the unnecessary heat. As already pointed out, unless this excess perspiration is allowed to escape, it will condense on clothing, resulting in wet clothing. This will increase the loss of heat from the body.

Excess perspiration must be controlled if you want to stay warm. The most logical way to control it is to prevent it — by not wearing more clothing than is necessary or by opening a collar, unbuttoning the front of a sweater, or throwing off a bed cover when you begin to perspire. Once you begin perspiring excessively, your body will continue to feel cold unless the fabric is very absorbent and allows the moisture to escape.

Another significant way to increase warmth through clothing is to increase the number of layers of clothing worn. Several lightweight, loose layers of clothing will keep you warmer than one heavy layer because air is trapped between the layers of clothing.

This air is warmed by body heat and in turn insulates the body. Layers could be provided by a vest and jacket over a shirt, or an undershirt, shirt and sweater. Lined garments generally are warmer than unlined garments because of the additional layer. Accessories such as ties and scarves can help provide more layers of warmth. The number of layers is directly related to the amount of warmth created, but this should not be confused with adding more weight — more weight does not necessarily mean more warmth.

The number of clothing layers needed to provide enough warmth depends on the amount of heat generated by the body. An active body naturally generates more heat, so fewer layers are needed to insulate the body to a comfortable temperature. As activity diminishes from heavy work to walking, to standing, sitting and finally to sleeping, the body burns off less heat so more layers of clothing are necessary to retain the heat the body does produce.

CLEAN CLOTHES

Cleanliness and dryness of the clothing also affect its warmth. If the air pockets in and around fabrics are filled with water or with dirt particles, they cannot hold the warm air, so will not insulate the body as well as dry, clean clothing.

Tight clothing, contrary to popular belief, does not keep you warmer. Tight clothing actually inhibits circulation so the body will not warm itself as efficiently. In addition, there is less chance for warm air to be trapped in the clothing for insulation.

The construction of a fabric also can contribute to its insulating qualities. Thicker constructions — waffle weaves, knits, pile fabrics such as fake furs — allow more air to be trapped within their surfaces, thus retaining more body heat.

Other thick constructions, such as quilted fabrics, laminated or bonded fabrics, or thick tweeds, also provide good insulation. Generally, the thicker the fabric, the greater the insulation will be. This also is true for shoes: the thicker the soles, the warmer the shoes.

Garment design affects insulation, too. Garments which fit close at the wrists, ankles and neck — parts of the body where warm air might circulate with cold and escape — will provide better insulation than garments open at these areas. Turtleneck collars are warmer than open collars; ribbed or botton cuffs are warmer than open sleeves; boots are warmer than shoes; pants are warmer than skirts. A belt at the waist or a tucked-in blouse or shirt helps trap air at that area of the body.

If any part of your body is cold, put on a hat or scarf. **Almost 90 percent of the body's heat loss is at the head.** If your head is covered, the excess heat that can no longer escape goes to other places — to the hands or feet, for instance — making these areas warmer.

With some careful planning, clothing can play a significant role in helping save on fuel bills this winter.