How your body loses and gains heat.

Your body loses and gains heat through several physical laws described below. All life is bound by the laws. By recognizing the general physics involved in the heat loss and gain, the survivor can intelligently assess virtually any situation placed before them and deal with the problems one by one. The don't freak out on the big words; just understand the simple principles behind them. Life, after all, it's very simple we choose to make a complex because it's better for the economy.

Conduction

Conduction is the transfer of heat through direct contact with an object, including hot or cold air against the skin. The direction of heat flow is always from a warmer to a cooler temperature. Any time you touch something that's less than 92° F, you lose heat through conduction. If the object touched is warmer than 92° F, your body gains heat. substances very end their thermal conductivity quite radically. Water has 25 times the conductivity of air, while muscles possess nearly twice the tissue conductivity of fat. Unless you find yourself are frequently floating, feet or other parts of the anatomy are in constant contact with the ground, hence the need for insulation in hot and cold environments. Hot desert ground temperatures can become almost unbearable. Under normal conditions, conduction Accounts for approximately 2% all the bodies heat loss for a standing person.

Convection

Convection is the transfer of heat through currants in air and liquids and can be either force were natural. An example of forced convection would be rolling down the windows of a moving car or sitting in front of a fan. Natural convection happens when destiny changes in heating or cooling molecules next to the body causes them to move away from the body itself. We all possess a boundary layer of slower moving molecules directly against our skin that is produced by the bodies radiate heat. This layer, which is only a few millimeters thick, equals a constant 3 miles per hour wind. For example, anyone who climbs into a scalding hot tub will do so very slowly and with much grimacing. After sitting still for a few minutes, however, the heat doesn't seem to be nearly as potent, until some dimwit bumps you and disturbs your boundary layer. All of a sudden, the water miraculously seems a lot hotter.

Classic convection experienced by every outdoor traveler is the wind. " wind chill," a term coined by American explorer Paul siple, causes existing outside air temperatures to fill a heck of a lot colder than they actually are and is a common killer of all outdoor enthusiasts, as it greatly increases the possibility of death through hypothermia. In contrast, hot desert winds can feel like a hair dryer on the skin. They suck away evaporating sweat so quickly that you might not think it's hot because it appears as if you're not sweating. Sweat

evaporating from the skin at such an accelerated rate does little to help cool the body. According to paleoanthropologists, the oldest structure ever found is a wind break built by early hominids in Africa more than 3.25 million years ago, proving that took action from the wind has been in vogue for a very long time.

Convection features almost as many variables as there are corporate tax breaks, including surface shape, density, surface temperature profiles, flow dynamics, conductivity, and specific heat. This crazy variation means that conveccive heat loss or gain is a wilderness wild card that can cause you to push up daisies. Researchers have found that under neutral conditions, 40 percent of the key loss from a naked human body stems from a convection, add wet clothing and or strong winds to the scenario, which are common occurrences in the outdoors, and the percentage climbs drastically.

Radiation

Radiation is the act of losing heat through radiation. There are two types of radiation we all are concerned with. Terrestrial, or long way radiation, emanates from fire, a human body, or just about anything else on the planet having a temperature greater than absolute zero or -460° F. Radiated by he is the emission of electromagnetic energy in infrared wavelengths of which the body is both emitting and receiving. Curling up in the fetal position reduces your radiant heat loss by 35%, compared to a person standing with arms away from their sides. Snuggling next to your honey on a cold winter night means you're enjoying his or her one way of radiation, which for mammals is some what consistent. Creativity with this concept can result from fifth can result in a grab bag of fresh pickup lines at the neighborhood bar. Radiant heat loss is a force to be reckoned with, as it accounts for around 45% of the total heat loss from a nude body in neutral conditions. surfaces that are good at absorbing radiation are also good at emitting it.

Shortwave radiation emanates from the sun and varies in its intensity according to the time of day, altitude, latitude, surface reflection, atmospheric pollution, ozone levels, and season. Most ultraviolet radiation bathes the earth at midday, 80% between the hours of 9:00 AM and 3:00 PM and 65% between 10:00 AM and 2:00 PM. Radiation from sunlight can keep a person in three ways: directly on the skin, reflected off particulate matter in the atmosphere, and an reflected off the ground. Unlike long way of radiation, shortwave radiation is absorbed to a greater extent by darker colored clothing and skin pigmentation. In hot climates, all can lead to dehydration and then hyperthermia if not properly managed.

Evaporation

Evaporation is the act of losing heat through the conversion of a liquid to a gas. The principal way your body loses heat in a hot environment is the evaporation of water in the form of sweat upon your skin, as well as a small amount of evaporative cooling gained from

exhaled moisture. A gram of sweat evaporating off skin with a normal temperature loses about 580 calories of heat. In the desert during July, the 2.6 million sweat glands humans have act as a savior. On the other hand, in the winter cold, clothing that is sweaty from over extortion will place you one step closer to death by increasing your chances of hypothermia. Interestingly enough, most mammals don't have sweat glands but keep cool by painting(evaporation through the respiratory tract), increased salivation, and skin and for licking.

Respiration

Respiration is that losing heat and water vapor through the respiratory surfaces of the longs by breathing. The air you inhale must be humidified by the body to saturation in order to be used efficiently. When this vapor is exhaled, the resulting evaporative heat loss at high altitudes can rival sweat as a cooling factor. More typically, however, respiration heat loss is minor in comparison to the others previously mentioned. A tremendous amount of water can be lost through the breath, especially in extreme cold temperatures. Cold, dry air breathed into warm, moist lungs pulls out as much as two quarts of water daily in -40° F temperatures. in some instances, the same condition can destroy the cells lining the respiratory tract.

Cold temperatures

In summary, if walking around in cold temperatures without been slated for aware or lying on non insulated ground(conduction) while wearing sweaty cotton clothing (evaporation) in the wind (convection) without the ability to make a fire (radiation) can kill you.

Hot temperatures

In hot temperatures, radiation from sun directly (three times) directly on the skin, reflected off the ground, and reflected off particulate matter in the air, can heat up conductive ground surfaces in excess of 150° F. This helps produce heated convective winds capable of evaporating sweat obscenely fast with little cooling effect for the body. Add the crushing effect of metabolic heat produced by trying to dig the car out of a wash at noon, and you have a serious setup for dehydration, hyperthermia, and death.

The cold weather bottom line

1. Produce heat.

Exercise using the body's larger muscle groups squads; eat calorie dense foods, especially carbohydrates, frequently throughout the day; creates fire in conjunction with space blankets or other reflectors if possible; locate south facing micro-climates for maximal sun exposure; hydrate using warm hot fluids with dissolved hard candy or other sugars when available.

2. Decrease heat loss.

Wear proper clothing especially in the head, neck, and torso areas; replace wet clothing with dry; create or find shelter from the elements; decreased surface area while increasing volume; avoid or insulate the body from cold surfaces.

3. Avoid becoming exhausted a 60% rule.

Working at 60% allows the body to burn fat reserves instead of using the glucose and glycogen stores. Get adequate sleep and rest.

4. Reduce the internal and external constriction.

Avoid ingesting vasoconstricting substances; tight clothing, equipment, and footwear.

5. Stay hydrated.

Drink warm to hot liquids if possible; urine should appear clear.

6. Stay aware of what's happening around you.

Be conservative. Don't take unnecessary chances. Cultivate and maintain a march on attitude.

Once you are familiar with how your body loses and gains heat, it's easy to understand how an innocent little day hike, through the compounded result of basic physics, can turn into a life threatening state of affairs. In the case of lost or forgotten gear, learning the basics of heat transfer allows you to improvise insulation and other needs directly from the wilderness.

The hot weather bottom line

1. Reduce heat gain.

Stay in the shade; create or find shelter with air movement; insulate the body and avoid hot surfaces by going above or below scorching ground temperatures if possible; seek cooler north facing micro-climates with minimal sun exposure; avoided physical exertion during the afternoon; wear proper clothing; keep hydrated; save movement for early morning, late evening, or night.

2. Increase heat loss.

Increase surface area while decreasing volume; wet clothing if possible, especially the head, neck, trunk, and groin areas; increase air movement; lie on or against cooler micro-climates.

3. Avoid becoming exhausted 60% rule.

Working at 60% allows the body to burn fat reserves instead of using a glucose and glycogen stores; rest and conserve during afternoon heat. Get adequate sleep.

4. Reduce internal and external constriction.

Avoid ingesting vasoconstricting substances; tight clothing, equipment, and footwear.

5. stay hydrated.

Drink cool too cold liquids if possible; urine should appear clear; shut mouth and breathe through the nose; limit talking.

6.Stay aware of what's happening around you.

Be conservative. Don't take unnecessary chances. Cultivate and maintain a march on

attitude.