

Warm in the cold - a few words about temperature and staying warm.

Extremes. The average temperature on the earth surface is +15 °C. It can vary with as much as 147° C between the coldest and the warmest recorded temperatures.

Coldest records:

In the world:	Russian Antarctic station Vostoc in 1983:	-89.2 °C
In Sweden:	Vouggatjälme in Lappland in 1966:	-52.6 °C
In Ireland:	Markree Castle, Co. Sligo in 1881	-19.1 °C

Heat records:

In the world:	San Luis, Mexico in 1933:	+57.8 °C
In Sweden:	Uppsala in 1933	+38.0 °C
In Ireland:	Kilkenny Castle in 1887	+33.3 °C

In Ireland the average temperature is + 10 °C over the year. Minimum air temperature falls below zero for about 40 days / year at inland locations, but for less than 10 days / year in most coastal areas. Air temperatures inland normally reach 18 to 20 °C during summer days, but only about 8 °C during wintertime.



Scales. The most used scale for measuring temperature is the Celsius scale. Named after Swedish astronomer Anders Celsius (1701-1744). The scale is based on the span of 100 °C, with water's freezing point at 0° and water's boiling point (at sea-level) at 100°. The Kelvin scale is named after the Belfast born mathematician William



Thomas, later Lord Kelvin. The scale starts at the absolute 0 point. This is the same temperature as -273.15 °C. The Kelvin scale is mostly used in scientific papers, but it is great for the understanding of heat-pumps; it makes it easier to understand that there can be energy in outside air that is 0 °C (= 273.15 Kelvin (K).)

The Fahrenheit scale is still used in conversations in the US. According to this scale water will freeze at 32 °F and water will boil at 212 °F.

Conversion scale: $T^{\circ}\text{F} = 9/5 \cdot T^{\circ}\text{C} + 32$ $T^{\circ}\text{C} = 5/9 \cdot (T^{\circ}\text{F} - 32)$

Wind chill is the apparent temperature felt on exposed skin due to the combination of air temperature and wind speed. The wind removes the heated air near the body, more heat is coming from inside of the body to be swept away again. If this process is repeated to many times, the whole body gets cooled off. At an external temperature of 0 °C and a wind of 5m/s, the cooling effect on exposed skin is the same as it would be at -9 °C



Apeman. Over many millennia man developed and lived in a tropical climate without protective clothes. The heat-balance for a human with a body temperature of 37 °C is perfect at a room temperature of +27 °C. The reason that we can survive in colder climates is due to our ability to make warm clothes and build warm houses. Our bodies need energy in form of food and drink. Most of the energy our bodies use goes towards maintaining a constant body temperature of 37 °C. The body heat is produced by combustion of food such as fat, carbohydrates and protein. The production of heat takes primarily place in our muscles and the heat-production is increased the more muscles are involved and the harder they have to work. If we are exposed to cold we need more food to be able to produce more heat via physical activity to keep the body temperature at 37°. The heat production for a normal person in rest is 80-100watt, roughly the same as an old lightbulb. The heat production in the body can be as high as 1000watts at very hard physical work.

Old wisdom. People understood these facts in old Ireland. If there seemed to be a shortage of food the coming winter, people were careful to have extra much turf cut. With a warmer house people could survive on less food. An active teenager never seems to freeze. No wonder; they eat a lot, they move around a lot and they are growing all the time. As we grow older the metabolism slows down - we produce less heat – and we need higher temperatures in the rooms we live and sleep in.



Hypothermia is when the body temperature is lower than 35°C.
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Hyperthermia is when the body temperature is above 40 °C
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