Calorimetry

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Heat transfer: relation between mass, time and energy.

Heating a mass of water of 1 kg from 20°C to 30°C demands 1/2 less energy than would a mass of 2 kg from 20°C to 30°C ; and 1/2 less energy than needed to raise 1 kg from 20°C to 40°C.
We observe a double proportionality between energy, mass, & the difference in temperature ΔT.

$$Q = Cm\Delta T$$
$$Q\ heat = C\ [J/kg/^{\circ}C] * m\ [kg] * \Delta T\ [^{\circ}C]$$

C is the coefficient of heat capacity. It's the quantity of heat needed to raise one kg of matter by 1°C. If the value of C is high, the material will need more energy to be heated. A high C characterizes a high resistance to temperature change. (thermal inertia)
To cool down 1 kg of water by 1°C, you have to substract C.

$$C_{water} = 4180\ J * kg^{-1} * {}^{\circ}C^{-1}$$
$$4180\ J = 1\ kcal$$
$$C_{oil} \sim 2000\ J * kg^{-1} * {}^{\circ}C^{-1}$$
$$C_{metals} \sim \leq 1000\ J * kg^{-1} * {}^{\circ}C^{-1}$$

The high thermal inertia of water:
$\longrightarrow$ stabilizes earth's climates. Oceanic climates have a shorter amplitude than continental ones. (like Belgium, the Nederlands and the UK)
$\longrightarrow$ stabilizes the temperature of the human body. $C_{human} \approx C_{water}$.